

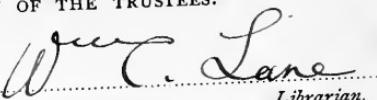
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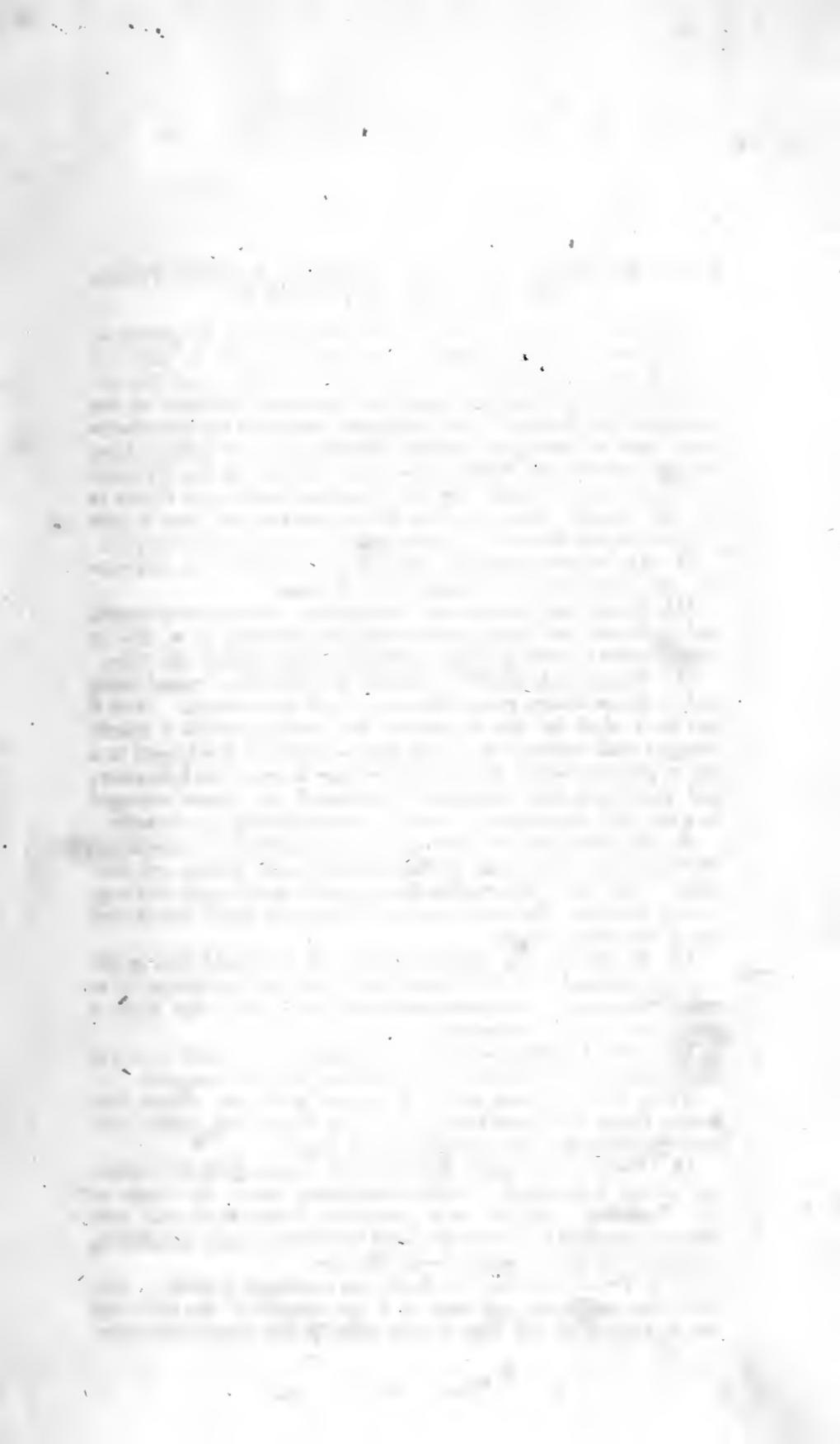
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OBSERVATIONS

ON

CHRONIC DEBILITY.

LONDON:
PRINTED BY J. MOYES, GREVILLE STREET.

OBSERVATIONS
ILLUSTRATIVE OF
THE HISTORY AND TREATMENT
OF
CHRONIC DEBILITY;
THE PROLIFIC SOURCE OF
INDIGESTION,
SPASMODIC DISEASES,
AND VARIOUS
NERVOUS AFFECTIONS.

BY WILLIAM SHEARMAN, M.D.

MEMBER OF THE ROYAL COLLEGE OF PHYSICIANS, PRESIDENT OF
THE MEDICAL SOCIETY OF LONDON, SENIOR PHYSICIAN
TO THE ROYAL WEST LONDON INFIRMARY,
AND PHYSICIAN TO THE LONDON
DISPENSARY.

“Et imbecillis, quo in numero magna pars urbanorum, omnesque
pene cupidi literarum sunt, observatio major necessaria est, ut quod,
vel corporis, vel loci, vel studii ratio detrahit, cura restituat.”

CELSUS *de Re Medica.*

LONDON :
PRINTED FOR THOMAS AND GEORGE UNDERWOOD,
32, FLEET STREET.

1824.





P R E F A C E.

It must often have occurred to others as well as to the author, to have met with patients labouring under symptoms denoting a deviation from perfect health, in whom some of the functions of the body have been weakly and imperfectly performed, without being able to characterize those symptoms by any generic name contained in the systems of nosology; when it has been difficult to recognize any positive disease, but merely a state of weakness and debility.

This state of debility or weakness, in which some of the necessary actions of

the body are performed with less than their ordinary vigour, is sometimes the result of disease ; but it also frequently arises from various other causes affecting the animal system ; not only rendering it more liable to be acted upon by the exciting causes of disease, but constituting in itself a state of hazard and danger which requires no inconsiderable share of attention and skill to remove.

Debility alone is oftentimes no less distressing, nor less formidable, than actual disease itself, and not unfrequently as difficult of removal. To point out a few of the causes producing this affection, to endeavour to explain in some degree their mode of action upon the human frame, and to deduce a successful method of treatment, founded upon an attentive consideration of the nature of the malady, and a competent

experience of the effects of remedies, is the object of the following short treatise.

In executing the purpose had in view by the author, he has endeavoured to steer as clear as possible of all hypothesis, and to advance nothing but what appears to be fairly deduced from our present state of knowledge of the properties and functions of animal life. He has not bewildered himself in any metaphysical speculation on the *cause* of life, nor involved himself in the gross errors of modern materialism. Although he has stated that the living principle is the medium by which the intellectual faculties in man are exerted, he has studiously avoided assigning to those faculties themselves any dependence upon that principle, or attributing the actual existence of them to any combination or arrangement of vital powers whatever.

In the present day, when the medical profession in general are more than half suspected of holding tenets unfavourable to the belief of a future state, and of attributing even the highest intellectual powers to bodily organization, it seems to be almost incumbent upon every individual member of it, when he has opportunity, to exculpate himself from the charge. The author trusts, therefore, he shall be excused if he quotes, on the present occasion, a paragraph or two written by him several years ago, in reviewing Dr. Ramsey's work on the "Anatomy of the Brain, &c." as containing the sentiments he then entertained, and still retains, on this important subject.

" It is unnecessary to follow the author further in his remarks on the connexion between matter and mind, and their mutual influence upon each other. It is a vain

attempt to explain that which is beyond the reach of human comprehension. Let the anatomist point out the complicated structure of the animal frame, and the physiologist the wonderful adaptation of organs to their various functions, as instances of the divine wisdom in the construction of our fabric; but the mode by which the power of sensation and action is imparted to matter, is for ever hidden from his research. The gradations of *life*, from the lowest vegetable to the most perfect animal, are so imperceptible, that we have every reason to believe it to depend on one common principle, diffused in various degrees to the different orders of beings. When we look within ourselves, however, we find powers so superior to any possessed by every other animal, and so **DISTINCT IN KIND**, as to leave no room to doubt we are animated

by a higher principle than any other of the various species of animals. The power of comparing ideas, of separating and variously combining them ; the power of forming abstract notions, as of virtue, gratitude, beneficence ; and the power of comprehending moral and religious truths, are all faculties so superior in kind to those possessed by any other animal, as at once to separate us from the species below us by an immeasurable distance. The Divine Wisdom has bestowed upon every order of animals precisely those powers and faculties which may enable them to attain every possible enjoyment from that mode of life they are intended for by nature. Man alone possesses desires and powers to which his situation on earth is inadequate ; and which, were this to be the only state of existence, would be superfluous. Can we

believe that we ourselves shall be the only instance of failure of the perfect adaptation of means to the end proposed ? That happiness for which we are so eminently qualified, and which is unattainable here, we are taught to expect in that future state to which we with confidence look forward.”*

The author is aware that the observations contained in the following pages cannot lay any claim either to novelty or depth of research ; but they are the result of some experience and reflection. The groundwork of his opinions was long ago derived from the instructions of that able and eminent teacher, Dr. George Fordyce, and some of the illustrations are borrowed from the same source. They are submitted rather as materials for working up by more able hands, than as a finished production.

* New Medical and Physical Journal, May, 1814.

It sometimes happens that in the rage for novelty, and subservience to fashion, obvious truths and important doctrines (because a little antiquated) are overlooked or disregarded. To recall the attention to some of these may not be without its utility, notwithstanding the attempt shall be made by one who is little versed in the graces of composition, or gifted with the powers of persuasion.

Northampton Square,
Nov. 4, 1823.



OBSERVATIONS,

ETC. ETC.

THE words debility and weakness are employed, in common language, to express indiscriminately both an originally weak state of the animal system, inherited from birth, and also any deviation or decline from the usual and ordinary degree of strength, accompanying, or left after, the termination of disease, or produced by debilitating causes; yet these two states of weakness are essentially different in them-

selves, and require, in our attempts to remove them, very different methods of treatment.

A state of perfect health is quite compatible with an original weakness of constitution; although deficient in strength, when compared with other more robust bodies, a person of delicate constitution may yet have the portion of vigour he possesses so accurately distributed and proportioned to the various parts of the system, as to enable each part to perform its appropriate functions, and constitute a state of perfect health: but weakness, or a deviation and decline from the usual degree of strength, when left by disease, or produced by debilitating causes, is never consistent with perfect health; the

vigour of the system is not only diminished, but the distribution of it, and the proportion derived to the various parts, are disturbed; and although the disease which produced this state shall have subsided, or the debilitating causes shall have been withdrawn, a great degree of attention is requisite to restore the system to its healthy and pristine state.

Weakness remaining after the termination of acute diseases, is much more easily cured than weakness produced by the operation of debilitating causes, without the occurrence of actual disease;* even when such debilitating

* In that particular species of catarrh called influenza, there appears to be some exception to this rule; for although the disease was, in every instance,

causes no longer continue to act, the weakness produced by them is much more difficult to remove than simple weakness, the consequence of acute disease. On the other hand, weakness produced by chronic disease, and that produced by the long-continued action of debilitating causes, are very nearly allied, and form together, as it were, a distinct species from weakness, the consequence of acute disease. In considering the history and treatment of debility, it is essentially necessary to keep in view these distinctions : the terms, simple debility, and chronic debility, might perhaps be conveniently

of short continuance, yet the debility produced by it continued, in some cases, for weeks, and even for months, and was with great difficulty removed.

used to designate these different kinds of weakness respectively.

Simple weakness, then, is either original, existing from birth, an actual primary deficiency of strength, not a diminution of previous strength ; or it is a consequence of acute disease, in which the strength formerly possessed has been in a great degree exhausted, during the progress of that disease.

There is inherent in the animal system a principle of conservation and reparation, which, when acting in its full vigour, obviates the danger that would otherwise frequently arise from impressions made upon the system by various causes, internal or external, as well as restores the different parts to a healthy state, after their having suffered

injury from accident or disease: this principle, or power, is known to physicians under the name of *vis medicatrix naturæ*; and it is chiefly in the management and direction of this power, that the skill of the practitioner is manifested in the treatment of disease.

In weakness produced by acute disease, in a constitution of tolerable soundness, this principle, is of itself generally sufficient to restore the lost strength, provided the disease has totally subsided; or the action of this principle may be assisted by appropriate remedies: but if it should happen that, from a deficient action of the *vis medicatrix*, or the failure of medicines, the weakness is not removed, it then becomes itself a cause of disease, or degenerates into

the species denominated chronic weakness.

With whatever portion of strength an animal body may originally be endowed, or whatever degree of strength it may have acquired during the progress of growth, the ordinary actions of the system itself will in time exhaust the vigour of the constitution, and at length produce general weakness; but this weakness, being also unaccompanied with those distinctive characters, hereafter to be mentioned, is to be designated simple, not chronic weakness: It is to be observed, however, that simple weakness, either arising from original conformation of the body, or produced by acute disease, or accompanying old age, renders the system more liable to

be affected by slight causes of disease, and hence becomes in itself a serious object of concern.

Strength and weakness are, respectively, the greater or less capacity in the animal system of performing the various functions of life, and sustaining the action of external agents upon its different organs: weakness is general when the whole system, and every part of it, are inadequate, although in unequal degrees, to the performance of their appropriate functions ; partial, when some particular organ or structure only is the seat of weakness, all other parts continuing in their usual and healthy state : in other words, weakness may be divided into general and local, and each kind requires an attentive consideration.

Weakness may take place, not only in some particular organ, or part of the body, as the lungs or stomach, but may pervade a whole order of structure, as the nervous system, the secreting or the absorbing system : likewise increased and inordinate action of any one of these systems may, by an undue expenditure of the living power, deprive the body generally, or some other system, of its due share, and thus produce weakness more or less general.

To enable us to appreciate justly the relative proportion of living power, expended by each particular system, or order of structure, in a state of health, and to estimate the deviations from such healthy state, as well as to comprehend the means of obviating the ill effects

arising from such deviation, it will be necessary to premise a few general observations on the exertion and reproduction of this power.

A living animal body may be considered as an assemblage of particles of matter, constituting one identical mass, fitted by the various properties with which it is endowed, for the performance of the several functions necessary for the preservation of its living existence, as well as for the propagation and reproduction of its species.

Animated matter differs from inanimate in this, that the former is endowed with the power of converting the surrounding matter which, under certain circumstances, comes into contact with it, into substances identical with itself,

whilst also the mechanical and chemical properties common to matter in general are in it partially suspended or variously modified.

The power by which the mechanical and chemical properties of common matter are thus suspended or modified, and new properties added, is called VITAL POWER, and the state thus produced by such suspensions and modifications is called LIFE.

Life has usually been divided into ANIMAL life, and VEGETABLE life, but without any degree of precision: these two classes of beings, indeed, animals and vegetables, are distinguished by the number or extent of vital properties they respectively possess; but the principle imparting these properties to each

of them is in identity the same, and even the gradation between the extreme limits of each class is so imperceptible as to be with difficulty recognised.

That both in animals and vegetables the mechanical properties common to all matter, and the chemical powers appertaining to certain substances, are suspended and modified, is evident from the following instances.

It is a law of mechanics, that the quantity of motion excited in any body is in exact proportion to the momentum imparting that motion, is determined by the mass and velocity of the impelling body; but the animal fibre frequently exerts a power of motion infinitely beyond that contained in the body exciting it: all the fibres of the

ventricle of the heart will contract with great force, upon one of them being gently touched by the point of a needle, with an impulse which would scarcely excite motion in a mass of inanimate matter weighing a single grain. The power by which animal fibres exert motion so disproportioned to the exciting cause is called *irritability*, and is a property superadded by *life*. The same thing is also observed to take place in several species of vegetables.

That the laws of chemistry are suspended and modified, is evident from this : a solution of sugar, or of farinaceous matter, exposed to a certain degree of temperature, invariably undergoes a process of fermentation, and is converted into vinous spirit or vinegar ;

the same solution, received into the stomach of an animal in a strong and vigorous state, does not, at the same temperature, undergo this process of fermentation. The usual laws of chemistry are not only suspended, but altered; for by the action of the living power, a new and different substance is produced from this solution, *viz.* chyle, and at length blood—substances which cannot, under any circumstances, be obtained by chemistry out of the body; proving that new laws of chemistry as well as of mechanics are superadded by life.

On the other hand, when the living power is deficient in action, the usual fermentations take place within the stomach, even with greater rapidity than

in atmospheric air, and constitute one fruitful source of disease.

The same suspension and modification of chemical laws take place in vegetables; new species of matter are produced in them, not to be obtained by any chemical process uninfluenced by life.

Whatever may be the origin of the production of living power in an animal body, it appears that the supply of it is not inexhaustible; it is limited to a certain quantity only, adapted to the purposes and ordinary wants of the system. An over-exertion of the system generally may therefore produce an undue exhaustion of this power, as may also an inordinate action of any one part of the body; depriving other parts of their

usual and requisite share, thus producing partial, and at length general weakness.

It is by the influence of the living power inherent in every part of the body, that all the animal and vital functions of the system are performed, all voluntary motion takes place, and every faculty of the mind is exerted. An undue expenditure of the living power in any one of these ways produces weakness of the whole or part of the system.

The production and expenditure of this living power are regulated by certain general laws, which it may be useful briefly to enumerate: in doing this, I shall abstain from entering into any romantic speculation on the *nature*

of this living power, or of the organ by which it is supplied, if there be established, as some suppose, a distinct organ for this purpose; my intention is, only to state obvious and ascertained facts connected with the exhaustion and reproduction of this principle, on which depend all motion and sensation in animal life; for it is to animal life solely, and chiefly to the human species, that our observations are henceforth to apply.

The two principal means by which, in an animal, the living power is constantly expended, are *motion* and *sensation*; the former the property of the muscular, the latter of the nervous system: in man, also, the faculties of the mind, comparison of ideas, abstraction, and judgment, depend upon the same prin-

ciple for their exertion ; and in health the supply is adequate to the performance of all the requisite functions both of body and mind.

A continued exertion, however, either of body or mind, is incompatible with health and even with life. With the exception of one description of moving powers, to be mentioned hereafter, alternate states of action and cessation are essentially necessary : as the action of every part exhausts the living power ; so rest from action restores that power, and the means by which the living power in the whole system is recruited after exhaustion is SLEEP.

During this state, when perfect, and in proportion to its perfectness is its efficacy, the whole system and its

various parts regain that portion of living power, of which by action they had been deprived. But although thus serviceable in reproducing the portion of living power expended by the action of the system or its different parts, it does not appear that any *accumulation* of this living power takes place during sleep, beyond the quantity usually employed for the ordinary purposes of the system: on the contrary, sleep continued beyond the period necessary for the reproduction of the living power previously expended, tends greatly to exhaust the strength.

The nervous system, in the human subject, is said to consist of the brain, the spinal marrow, and the nerves sent off by, or proceeding from, each of the

former. The nerves are distributed to every part of the body, and may be said, indeed, to compose a considerable share of the intimate structure of its different organs, except perhaps the bones. The office of the nerves is, to convey ideas to the mind from impressions imparted to their extremities, and to excite motion in the voluntary muscles at the command of the will.

Various hypotheses have been invented to explain the mode in which the functions of the brain and nerves are performed; some have imagined it to be by means of a subtle fluid secreted in the brain and contained in the nerves as fine tubes; others, that it is by a vibratory motion of nervous fibrillæ; some suppose it to

be by the influence of electricity, others by the influence of galvanism. None of these suppositions are satisfactory; it is sufficient for our purpose to know that the power of the nerves to communicate sensation and produce motion, is one of the properties of life, and that the exercise of it consequently occasions an expenditure of the living power.

The relative quantity of living power expended in performing the functions of the nervous system, varies much under different circumstances: in communicating ideas to the brain from impressions made by external objects, this quantity is regulated by the attention bestowed by the mind upon the impression made on the sentient extremities of

the nerves ; so that external impressions of equal force shall, apparently at one time, greatly exhaust the living power in the mind, and at another time very little, according as the attention is more or less directed to such impression ; and in proportion to the attention excited, is the expenditure of living power : this may be illustrated by a familiar instance.

The auditory nerves shall receive at two different times continued impressions of precisely equal force ; at one time, from the vibration of a fine-toned musical instrument, at another time from the vibration of a bell, or other common sounding body. In the first case the person is desirous to distinguish every variation of tone, and is interested in observing the harmonious concord of

the different notes produced from the instrument ; this requires a considerable effort of the attention, and occasions, sooner or later, fatigue and lassitude by the expenditure of living power, so that at length the nicer shades of difference in the various notes can be no longer perceived : on the contrary, the sound of the bell, although producing the same impression on the sentient extremities of the nerves, not having the attention directed to it, occasions none or very little expenditure of the living power, and may be continued for almost any length of time, without producing fatigue, almost without consciousness on the part of the hearer.

The expenditure of living power, also, in the performance of muscular motion,

is greater or less, in proportion to the attention of mind requisite in directing the muscles concerned in those motions. In learning to produce any particular action, wherein a combination of the motion of several different muscles is requisite, considerable attention is at first employed to direct the action of each particular muscle, and fatigue is produced; by repeated practice a greater facility of performance is acquired, and at length the combined operation is carried on by the power of habit or of association, almost without any attention of the mind, and consequently fatigue is scarcely at all felt.

We find that scenes of great novelty, and employments to which we are unaccustomed, arresting the attention

strongly, fatigue the mind much more than our ordinary occupations, and familiar scenery, to which we scarcely attend.

The operations of the mind, also, within itself, if I may so say, that is, when no corporeal action is conjoined, or immediately follows, require a very great expenditure of living power ; reasoning, judgment, abstraction of ideas, &c. when long continued, powerfully exhaust the strength of the system ; and it is to be observed, that an undue exertion of mental energy weakens the corporeal functions, and *vice versa*, exclusive or almost exclusive action of corporeal organs weakens the mental powers : it is by observing a nice proportion between the two, body and mind, that perfect vigour of both is alone preserved.

Even when the relative proportion

of living power, thus appertaining to the body and mind respectively, is duly maintained, partial weakness in either may be produced by the unequal employment of its own share; some organ of the body unduly exerted weakens other corporeal functions, some faculty of the mind exclusively exerted renders other faculties less acute, so entirely does perfect health and vigour of mind and body depend upon the just and accurate distribution of the living power.

Although the living power is thus constantly expended by means of sensation, motion, and intellectual operations, and again reproduced or reacquired during intervals of cessation, or diminished exertion of these respective actions; yet a total, or almost total, in-

terruption of them, would by no means tend to accumulate the quantity of living power, beyond that requisite for the ordinary expenditure of the system in its present state of health and action: on the contrary, by ceasing to employ any set of muscles for a considerable time, they would become less capable of exertion; less living power would be derived to them, because no demand had, as it were, been made for a supply, no accumulation would have taken place, the supply would have been equal to the ordinary demand, and no more. By a gradual increase of action in any one part of the body, a gradual increase of living power is derived to that part; by a gradual increase, also, of all the actions of the

body, and faculties of the mind, a gradual increase of living power takes place in the whole system; so that, in fact, strength is actually, within certain limits, produced indirectly, by the very exertions which are to expend that strength.

I have adverted, hitherto, only to those actions and operations of the system which are performed occasionally, with intervals of relaxation or rest—sensation, voluntary motion, and intellectual operations, all more or less under the direction of the will, and exhausting the strength of the system, in proportion to the attention of mind requisite for the performance of these actions; but there is also a series of functions, which are in constant action, more or less perfect

in proportion to the quantity of living power supplied to the parts which perform them—circulation, digestion, secretion ; these are totally uninfluenced by the will, and are incapable of increase or diminution by any attention of the will directed to them.* The organs performing these respective functions largely expend the living power, and when excited beyond their ordinary and accustomed motions, are powerful causes of debility or weakness.

Although it has been said, that the

* An exception to this statement may be thought to exist in the case of the circulation, which certainly may in some measure be influenced by an anxious attention to the state of it ; but this effect is produced indirectly and incidentally ; the circulation cannot be increased or diminished by any voluntary effort made *purposely* to do so.

undue exertion of any set of functions, corporeal or mental, tends greatly to weaken other parts of the system, it has also been noticed, that a moderate exertion of any particular set increases the strength of those parts respectively ; but it is necessary to advert also to a curious fact, namely, that weakness of other parts is not universally produced, it being found, in some instances, that the strength thus acquired by the exercise of particular parts of the body is communicated to some other parts or functions.

By what means this takes place it is not easy to explain. In medical language such effect is said to be produced by consent of parts : thus, a moderate exertion of the whole system of voluntary muscles not only strengthens that system, and in-

creases the muscular power, but at the same time imparts vigour and strength to the stomach, enabling it to perform its functions more perfectly, whilst the system of blood-vessels is hereby deprived of some of the force of contraction they before possessed ; and upon a knowledge of this fact is founded the principle of employing means to reduce the increased force of the circulation in chronic general inflammation or hectic fever, as will hereafter be shown.

The living power of the body is not only expended in the various actions of the system, constantly going on, but a considerable portion of it is employed in preserving the various parts in a condition fit for action, upon an exciting cause being applied ; this is more par-

ticularly exemplified in the muscles and blood-vessels, whose motions are performed by alternate contractions and relaxations, stronger or weaker, in proportion to the degree of strength they possess in their natural and quiescent state.

A muscle, during life, occupies less space than it does after death; consequently the particles of matter composing that muscle must be nearer together during its former state: a muscle, also, in its quiescent state, occupies less space at one time than it does at another time, according to the degree of strength inherent in the system of the individual: this approximation of the particles during life, so much beyond whatever takes place after death, is an effect of the

living power, and is usually called *tone*; it is capable of increase or diminution by various means applied to the system: we have no name to express its increase beyond its present existing state; a diminution of it, produced by any debilitating cause, we denominate *relaxation*.

When a muscle is excited by any stimulus, the particles composing that muscle come still nearer together than they were in its quiescent state, when the approximation was effected by the tone of the muscle; this increased approximation is called *contraction*—a state which is incapable, in ordinary circumstances, of continuance beyond a very short time, being speedily succeeded by a relaxation. When the strength of the system is great, this alternate con-

traction and relaxation of the muscles is less apparent than in a state of weakness; but it may be made perceptible in any one by exerting the muscles very forcibly, as by holding a heavy body, with the arm fully extended, when the oscillations of the weight will be seen to correspond with the alternate contractions and relaxations of the muscles.

A similar condition of tone and alternate contraction and relaxation takes place in the blood-vessels; but as some erroneous notions seem to prevail concerning the powers producing the circulation, it will be requisite to enter briefly into the subject.

The blood thrown out of the heart into the aorta is transmitted through the arteries to every part of the body;

it was formerly supposed that this conveyance of the blood was performed by the action of the heart alone, propelling the fluid along the vessels ; but this opinion is now generally abandoned, and we find it commonly stated by authors, that when the blood is thrown into the aorta by the heart, the vessel is distended beyond its elasticity, and is again contracted by that power, so as to propel forward the blood and return to its former diameter. A recent author * says, in his Treatise on Inflammation and Fever, “ to bring the elastic principle into action for the support of the circulation, with all the effect of which it is capable, it is necessary that the

* Dr. Lucas.

arteries should be in a state of forced distension, by which means a steady and permanent exertion of the elastic force, will be kept up for the propulsion of the blood."—"It must indeed be evident, that unless more or less of forced distension of the vessels were present, the elastic force could not be called into action at all for the propulsion of the current."*

This is by no means a correct statement: the artery, even in its utmost state of dilatation, is of much *smaller* diameter than it is ever found to be after death,

* Dr. Good also says, "the existence of muscular fibres in arteries and veins has been of late doubted by many, and the contractility of the arteries has been ascribed to their elasticity alone."—*Study of Medicine*, vol. ii. p. 8.

which could not be the case, were elasticity the cause of its contraction ; this power not being a property of life, but existing equally in the dead solid. The power which produces the contraction of the vessels is opposed to, and constantly counteracts, elasticity, and is essentially a property of life.* Whatever be the quantity of blood in the vessels, they are always full ; the living power invariably adapting the size of the vessels to their contents, and preserving them of a cylindrical shape ; for if the vessels are emptied to such a degree that they cannot compress upon the blood, and continue cylindrical, the animal dies.

* See the author's paper on this subject in the Medical Repository for September 1823, p. 181.

The vessels are disposed to contract very differently at different times, as is the case with all the contractile parts of the body. The stomach at one time will receive a large quantity of food; at another time, a sense of fulness and distension will be produced after eating half that quantity. So the urinary bladder will at one time contain a pint of urine with greater ease, than it will one or two ounces at another time; and so of all the distensible parts capable of containing fluids. The vessels, then, having a disposition to contract to a certain size, if there be as much blood in them as will distend them to that size, they will press with considerable force upon that blood; but if they have not power to contract with strength, yet

they are obliged to contract upon it, and when made to contract beyond their tone, their strength is immediately greatly exhausted.

This effort of the vessels, constantly exerted, requires a very large expenditure of the living power. The function of circulation being so essential to life, a due supply of living power must necessarily at all times be derived to the vessels ; and whenever the circulation is by any cause of disease increased to an inordinate degree, or the quantity of blood in them is very much reduced in amount, so as to occasion a greater contraction of the vessels, it is evident that some other parts of the system must be deprived of its proportionate quantity, and weakness, more or less general, be produced.

Digestion is a function which requires a large supply of living power to effect its perfect accomplishment ; but as when perfectly performed, the products of this function, viz. chyle and blood, repair the waste of strength in every other part of the system, it cannot be considered as a function exhausting the living power, but *e contrario*. When, however, in consequence of improper substances employed as food, or of local weakness of the organ, (the stomach and upper intestines), digestion is imperfectly performed, more of the living power is exhausted than is reproduced by it ; and hence it becomes no inconsiderable source of debility.

The secretory organs, also, comprising all the various glands in the body, require a constant supply of living power

for the due performance of their functions; when deprived of their requisite supply by a debilitated state of the system, their functions are imperfectly performed, and disease is frequently produced; but they do not appear ever to produce weakness by abstracting to themselves, as it were, an over-proportion of living power, in a manner similar to the blood-vessels. Excessive secretions, indeed, frequently produce debility; but this arises rather from the nature and quantity of the secreted fluids, than from the action of the organs themselves.

The secreted fluids are either separated from the mass of blood by mere filtration, or they are formed from it by a decomposition and recombination of the elements constituting the blood,

entirely new compounds being produced. Of the former kind are the perspiration and urine ; of the latter are the bile, semen, &c. In proportion as the secreted fluid differs from the actual contents of the blood-vessels, is the quantity of living power required for its elimination ; the more perfect secretions, therefore, exhaust the strength of the system in a greater degree than the others ; and when excessive in quantity, are eminently productive of weakness.

Even the more watery secretions, when in undue quantity, contribute to weaken the system.* It has been supposed by

* Although the secretion of urine is an evacuation which weakens the system less than any other, yet that evacuation may be produced by medicines, whose operation on the system will weaken it more

some persons that the health of the body is preserved by encouraging the discharge from the skin in the form of insensible perspiration ; but this seems scarcely to be warranted in fact, since we find that in very cold countries, where the transpiration by the skin is in small quantity, the inhabitants are in general more strong and robust than in warm countries, where the transpiration by the skin is most abundant : the health and strength of the system, therefore, are not improved by the actual quantity of the secretion, but are influenced by its relative proportion to other functions.

than many other evacuations, where a greater quantity of the mucilaginous part of the blood is drawn off, as when produced by digitalis, for instance.

There are some orders of vessels in the body not included under the denomination of blood-vessels, as the exhalants and lymphatics : these also require a supply of living power for a due performance of their respective functions ; but, like the secretory organs, they do not appear to attract to themselves an inordinate proportion of this power, and in this manner to become a cause of weakness.

Weakness in any particular organ or order of structure, is known by the want of a due performance of the functions of that organ or order of structure, and constitutes especially local debility ; but as such local debility not unfrequently produces weakness of the system generally, and as chronic general weakness, pro-

duced by causes applied to the general system, or operating intermediately upon it, is attended with a train of symptoms impeding more or less all the functions of the body, it may be requisite to give a brief description of this affection.

There are some symptoms common to both species of weakness, and there are some peculiar to that species here denominated chronic weakness ; it is to these latter our attention is chiefly to be directed ; in enumerating them, however, I shall occasionally contrast them with the opposite ones arising in simple weakness.

The functions of the stomach, intestines, and other viscera, are considerably disturbed : the appetite is diminished, but is yet greater than the powers of

digestion ; the patient becomes very uneasy after eating : the food contained in the stomach not only runs into those fermentations to which it is disposed when uncontrolled by the vital power of that viscus, and hence acidity and flatulency are produced, but the mucous surface of the stomach itself, probably from a relaxation of the glands consequent to weakness, furnishes a more copious secretion of thick viscid mucus, more or less vitiated in its quality, in proportion to the deficiency of vital power in the secernt organs. The contents of the stomach in this case become an unnatural stimulus to that viscus, and produce disturbances which still further increase the weakness. Headach is not unfrequently produced

from this cause. Pain is occasionally felt in the region of the stomach, which may in some cases be owing to portions of the mucus rendered solid by the coagulating power of the acid colluvies, and thus becoming a source of irritation to the delicate texture of this organ. Swelling sometimes appears to take place, and the patient is harassed with a sense of considerable coldness in that region.

The peristaltic motion of the intestines is exceedingly irregular ; sometimes considerable purging takes place, partly occasioned by the increased action of the muscular fibres themselves, rendered more irritable and more easily acted upon from being in a state of weakness, and partly by the increased supply of fluids derived to the intestines from the

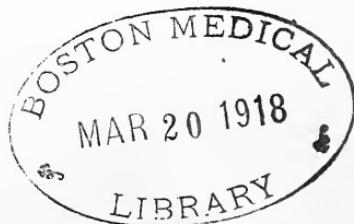
inordinate secretions of different glands, in a state of great relaxation in consequence of the same weakness. More frequently, however, obstinate costiveness occurs, accompanied with flatulency highly distressing. Partial contractions of different portions of the intestines take place; thus impeding the general functions of the canal, and giving rise to much uneasiness in the part contracted. This state of costiveness may also, in some measure, be attributed to the want of that healthy stimulus which it is the property of various secreted fluids to supply to the intestines; those fluids being now deficient in quantity, or altered in quality, in consequence of the weakness under which the respective secerment organs labour.

Among the glands destined to supply the intestines with fluids, either to promote their action, or to facilitate the ulterior process of digestion, or for both of these purposes, is the liver; an organ which, on account of the peculiarity of its structure, and the mode in which circulation is carried on within it, is very readily influenced by, and very soon partakes of, the general weakness of the system. Hence a train of symptoms denominated bilious, too well known to need a particular description, and too universally experienced by those whose frame is originally weak, or whose constitution has been impaired, either temporarily or permanently, by any of the numerous circumstances producing a state of debility ; at once the cause and

the effect of most of the maladies to which the human body is liable.

Either increased or deficient secretion may take place in glands labouring under debility, and these states may occasionally alternate with each other. It is of importance not to increase the weakness of an organ irregularly performing its functions from that very cause, by employing means to combat some imaginary disease of that organ, when a restoration of general strength, or of that of the organ in particular, would more effectually promote the end in view. How far this observation applies to the prevalent mode of treating *bilious* complaints, may be worth considering.

Whichever state prevails, whether



purging or costiveness, it is with difficulty removed, except by changing it for its opposite condition, the bowels seldom continuing in a regular state for any considerable period ; whereas, in simple weakness, the intestines for the most part perform their functions with regularity, although a deviation is readily effected by slighter causes than would operate in perfect health.

In chronic debility there is very little disposition to regular sleep, and what is procured is generally uncomfortable and restless. The renovation of the living power, it has been said above, was chiefly effected during sleep, and that in proportion to its perfectness was its efficacy : hence, under these circumstances, the ordinary waste of the living

power is not sufficiently repaired; and the debility goes on increasing. In simple weakness, such as arises suddenly from acute diseases, the sleep of the patient, although it is easily broken in upon, is, while it lasts, sound and refreshing ; and the living power is consequently maintained and increased, and the strength of the system is speedily restored.

The mind partakes of debility no less than the body. In chronic weakness it becomes less capable of exertion ; the patient finding himself incapable of his ordinary application to business or study. Not only is it less capable of exertion, but it is agitated and easily disturbed by slight and inadequate causes ; the temper becomes irritable,

and the disposition gloomy and desponding. In simple weakness, although the mind is equally incapable of great exertion, it is generally tranquil and composed : the feelings of the patient under these respective states being widely different. An anxious attention to the most minute changes in the symptoms usually accompanies chronic debility, and augments the inquietude of mind ; in that produced by acute diseases, the progressive relief experienced by the individual cheers his spirits and animates his hopes, and he is placed in the most favourable state for the complete restoration of strength to take place.

A considerable effect is produced on the circulation by a state of weakness.

In chronic debility the pulse is more frequent than in health; but it is not so easily affected by external circumstances, as in simple debility produced by acute disease, wherein, although it is usually below the standard of natural frequency, it is easily increased by slight causes. The stimulus of disease having ceased, a general state of lessened action takes place throughout the system, and consequently also in the heart; yet the irritability of this organ being increased in common with other parts, in consequence of weakness, it is more easily made to deviate from its regular action: although action is diminished, it may be rendered irregular by slight causes. In chronic debility there always exists morbid contraction of some vessels

or set of vessels ; and this contraction acts as a stimulus to the heart, and increases the frequency of its action, as indicated by the state of the pulse.

When weakness has in any manner been produced, dropsical symptoms are very apt to arise. We find this frequently to be the case after the termination of acute disease, as scarlatina and others : these symptoms, in the latter case, being the effect of weakness, usually subside in a short time, the strength being commonly quickly restored. In chronic debility, on the contrary, these dropsical symptoms frequently continue, even if we should be so fortunate as to remove the general debility which originally gave rise to their production. It may be that, although strength is restored

to every other part of the system, the absorbents may have sustained such a diminution of power as no longer to be able to perform their proper function.

Pain in the back is known to accompany every species of weakness, but the cause of this symptom has not been satisfactorily explained.

It appears to be an established rule, that in proportion as weakness is more slowly produced, it is the more slowly, and with the greater difficulty, got rid of: that debility, therefore, which accompanies, or is the consequence of long-continued chronic diseases, or which arises from debilitating causes, applied for a considerable period, however apparently slight, frequently baffles

our utmost efforts to remove it, and becomes itself, in its turn, the source of other and intractable diseases.

Chronic debility is characterised by irregularity of action of the living power, and is a fruitful source of that class of diseases denominated NERVOUS, in which irregular action forms the most prominent feature : hypochondriasis, chlorosis, chorea, and epilepsy, are among the most formidable of these. Whatever may have been originally the exciting cause of either of these diseases, they are accompanied or followed by chronic debility, and at length not unfrequently appear to depend upon this state for their continuance.

This is particularly exemplified in chlorosis and hectic fever, in which

irregularity of action takes place to a considerable degree, the vascular system drawing to itself an undue portion of the living power, in consequence of its universal inordinate contraction. Contraction of some vessels, or set of vessels, it has been said, is a constant concomitant, perhaps the actual cause, of chronic debility ; in proportion as this is more extensive, therefore, must be the degree of weakness produced, and the difficulty of removing it be increased.

As, during the state of chronic debility, liability to disease is much augmented, there will not unfrequently be combined the symptoms of some actual disease with those peculiar to the chronic debility : when we are able to remove

the latter, the disease depending upon this affection will sometimes subside, although our efforts to conquer the disease itself shall have been previously ineffectual. It is under such circumstances that much ambiguity and error prevail: what is ordinarily considered as the appropriate treatment of the existing disease, may be the very means of increasing that state of debility, which is the origin and source of the whole mischief.

Even diseases of strong action may take place in persons of very weak habits; for it is not uncommon, when the system in general is weak, for some part of the body to act strongly. Weakness even gives an irregularity to the whole system, so as to give stronger

action to one part in particular than to the others. It will sometimes happen, that when the habit is weak the arteries will act more powerfully; and this may even give occasion to active hæmorrhage, a disease of strong action, as from the lungs, intestines, or other parts of the body. Here, and in similar cases, although it is requisite not to neglect the appropriate treatment of the existing disease, it is essentially necessary to remove that state of debility which gave origin to, and maintains, the particular affection.

Diseases of debility may be divided into those depending upon the increase of the mobility, and those depending upon the increase of irritability of the system. In proportion to the degree

of weakness of the system, is the increase of these two properties of the body, irritability and mobility. By the increase of the former, parts are more readily excited to action by stimuli applied to them; whether the natural stimuli upon which their usual actions in health essentially depend, or external and adventitious stimuli: by the increase of the latter property, parts are more easily excited to action by stimuli applied, not to themselves, but to other parts, in consequence of what has been called sympathy, or associated action.

These two states may exist in various degrees of proportion to each other. Irritability seems to be the peculiar property of the vascular and muscular systems, mobility that of the nervous.

All the motions which take place in any of the moving powers of the system, are produced by causes originating and acting within the body itself. The vessels are excited to action by the stimulus of their contents. Certain muscles contract from a specific stimulus to which they are adapted by their original conformation, but the nature of which is unknown to us; as those of the eye to light, and of the ear to sound, impressing the sentient extremities of the nerves supplying those organs: some are influenced by associated action, as those of respiration with the lungs: other muscles contract from the direct influence of nervous energy derived to them by the will; these are called voluntary muscles.

It is this last set of muscles particularly whose action is rendered irregular by the increase of mobility ; not from any alteration produced in the state of the muscular fibre itself, but in the condition of the nervous energy upon which their excitement to motion materially depends.

To excite action in a moving part, it is not necessary that the primary cause of motion should be applied to the part itself; it may be applied to a part more or less distant. Thus motion is produced in the muscles of the eye and ear by applications made to the sentient extremities of the nerves supplying those organs ; in consequence of which, motion originates in the moving part. The immediate cause of

muscular motion exists within the body itself, *viz.* the influence of nervous energy.

That the motion in such cases is *original*, not communicated, is evident; because, were it the latter, the motion must be precisely equal in force and velocity to the loss of motion sustained by the body imparting it; but no proportion whatever exists between the motion produced in the nerve and that in the muscle. Commonly there is no perceptible movement in the former, although the muscular contraction may be forcible and violent: the muscle, therefore, has a power of moving itself without any external motion impressed.

The motion taking place in the volun-

tary muscles, also, is in the same manner original, not communicated.

A certain state of the nervous energy is requisite in both cases for this original motion to take place in the moving powers ; the nerves, although they do not effect the mechanical communication of motion, appear to impart or support some condition of the muscle, which enables it to commence this original motion.

Original motion taking place in the moving powers with greater facility, or from less evident causes, than in a state of health, constitutes, properly, that increased mobility which is one of the characteristics of chronic debility. Spontaneous action appears frequently to arise, for instance, in the voluntary

muscles, not only independent of, but contrary to, the efforts of the will, as in chorea and epilepsy; this mobility, it is presumed, depends upon some peculiar state of the nervous system; it is perhaps the chief cause of most spasmodic diseases.

It is superfluous to enumerate or describe the various diseases of debility, since they comprise nearly all those contained in our nosological systems. There exists in this state a general disposition to disease, so that the exciting causes of any particular affection, when applied, act with greater facility and certainty than they otherwise would do. When the functions of the body are performed weakly, they are more easily made to deviate by external appli-

cations. There are certain constitutional predispositions to particular diseases existing in some individuals, as to pulmonary consumption and scrofula : these diseases are more readily produced in a state of debility than they otherwise would be ; frequently they are brought into action from this cause, when, had the vigour of the system been fully and constantly maintained, they would never have appeared.

But the progress of every disease is considerably influenced by the state of debility, and the treatment requires to be essentially modified in consequence. The same exciting cause of inflammation may, for instance, produce that disease in a very strong habit and in a very weak one ; but the disease will assume

a very different character in the two individuals. In the former we shall usually have phlegmonous inflammation, with a strong tendency to suppuration: in the latter, erysipelatous inflammation, in which suppuration rarely, if ever, takes place when pure. The proper treatment of these two varieties differs also very considerably.

It is not within the plan of this little work to treat of the various modifications of particular diseases produced by chronic debility; but to offer a few observations on the causes of that affection, and to endeavour to point out the most proper treatment of it, considered abstractly and independently of any actual distinct disease with which it may at any time be combined.

In addition to this affection being the consequence of long-continued or chronic disease of every description, it may also be produced by various external accidental causes acting slowly upon the system ; or it may arise from some particular states of, or actions within, the body itself, independently of any external exciting cause applied.

The exciting causes of this affection are of two various and opposite descriptions : one set acts in a direct manner, by producing immediate and slowly increasing weakness ; the other indirectly, producing an intermediate state of the system, which ultimately terminates in debility : the first set exhaust the strength by their actual primary operation ; those of the second not only

do not exhaust, but they primarily increase the strength of at least a part of the system; it is only by their indirect effect they at length occasion a state of chronic debility.

The first set are more particularly called debilitating causes, since they produce weakness in a direct and evident manner; the second set consists of those causes which, although they occasion chronic weakness after a long-continued application, we not unfrequently resort to, as means of restoring strength to the system, under a state of simple debility, such as that produced by acute diseases. This intermediate state, effected by the operation of the latter description of causes, is PLETHORA, which may also arise from certain cir-

cumstances or actions, originating within the body itself, independent of any external exciting cause applied.

It may not be amiss to enter into a brief consideration of the state of plethora, and to point out the method by which it produces chronic debility.

It has been already stated that the contraction of the blood-vessels is performed, not by the elasticity of the fibres bringing them to their former state, after having been distended beyond their elasticity, but that it is performed by an original power of motion depending on life, and that this contraction is opposed to, and overcomes, the elasticity. It has also been stated that the vessels, when not in action, are always in a state of contraction, are

always smaller than they are after death, and that they are also preserved in this state of contraction by a power opposed to, and counteracting, the elasticity ; which power is called *tone*.

Whatever quantity of blood is contained in the vessels, they are always full ; the vessel is constantly contracted upon its contents, and is preserved of a cylindrical shape. If this quantity is in exact proportion to the state of tone and the disposition to contraction, the vessels are in a proper state of fulness : when more than this proper quantity is contained, the vessel is distended beyond its tone, or its disposition to be distended, and plethora is produced. It is evident that fulness may arise either from an increase of the actual quantity

of blood, or from an increase of tone and of disposition to action in the vessel; the balance between these powers being in each case deranged.

Plethora, then, may be produced by, *1st*, whatever increases the actual quantity of blood in the vessels, the tone remaining the same; *2dly*, by whatever increases the tone of the vessels, the quantity of blood remaining the same; or, *3dly*, by whatever increases the disposition to strong action or contraction of the vessels upon their contents, the tone and quantity of blood remaining the same.

The first state of plethora is produced by all those causes which favour the formation of blood beyond its ordinary waste; such as, nourishing food in large

quantities, an inactive and sedentary life, suppression of accustomed evacuations, &c.: the second (increase of tone) by such means as add strength to the system generally, including those just mentioned, together with the application of cold to the body in such manner as not to produce disease; as living in a cold climate, plunging into a cold bath, the use of astringent medicines, &c.: the third state, by whatever increases the disposition to strong action of the vessels, independently of any increase of tonic power, and which disposition to strong action is even compatible with a state of weakened tone of the circulating system, such as extraneous noxious substances contained in the circulating mass, certain irritations

in some parts of the body, or other internal causes to be adverted to hereafter.

It is this last state of plethora which more particularly induces chronic debility, and it may be supposed to effect this in consequence of a very large supply of living power being derived to the vessels, to support this increased action or contraction, thereby depriving other parts of their usual requisite quantity ; chronic debility depending, as has been said, upon an unequal and irregular distribution of the living power.

The two first species of plethora, that arising from an increased quantity of blood, and that arising from increased tone of the vessels, more frequently produce actual disease than chronic debility, such as acute local inflammation

or haemorrhage: should they fail to do this, however, and continue for any length of time, chronic debility would be the result; but as the symptoms of this affection will be the same, by whichever of the species it is produced, it will be sufficient to confine our attention to the case of plethora occasioned by a disproportioned action or contraction of the vessels, in relation to their tone and quantity of blood contained.

This increased disposition to strong contraction in the vessels, independent of increase of tone, and which has usually been denominated chronic general inflammation or hectic fever, is occasioned by certain substances conveyed into the blood-vessels, and acting as stimuli upon the irritability of the mus-

cular fibres, such particularly as mercury, guaiacum, and some other medicines; it is not unfrequently the result of some of the exanthematous fevers, as small-pox and measles, whether produced by the direct action of the contagious miasm upon the muscular fibres of the vessels, or merely the febrile contraction kept up by habit, a powerful source of protracted disease: the syphilitic virus diffused through the system is also occasionally one of the causes of this affection.

Pus, when absorbed into the circulation, has been thought by some to produce this effect; whilst the fact has been denied by others, who attribute the hard pulse and other characteristics of hectic, to a sympathetic action arising from

the irritation of local disease. This is a question undoubtedly of some uncertainty, because we find the same affection to take place when no pus is absorbed, as in obstruction of the menstrual discharge, and we have many examples of pus being absorbed without this affection taking place. Little doubt, however, can be entertained of the power of the other causes mentioned to produce this effect.

The different species of plethora are generally characterised by the state of the pulse. In that arising from an increased quantity of blood, the pulse is said to be full and *oppressed*. If the vessels are full of blood, that is, are containing as much as completely fills them to the extent of their present dis-

position to be distended, they will with difficulty receive the additional quantity thrown out by the heart; in fact, but little is received and but little transmitted at each contraction; the vessel appears to the feel to be full of blood and yet to act feebly: this is an oppressed pulse.

The pulse is the measure of the force and contraction both of the heart and of the arteries: when both are acting strongly, we have a strong full pulse; that accompanying an increased disposition to contraction in the vessels is said to be *hard*. When there exists a disposition to strong action or contraction in the vessels, not only is the additional blood thrown out by the heart received with difficulty, but the vessel

contracts speedily and strongly upon it, and gives a peculiar sensation to the touch, denominated hardness.

Hardness of the pulse takes place also in acute active inflammations ; but then it is combined with strength and increased action of the heart, and the pulse is strong and full, as well as hard ; whereas in chronic debility the power of action in the heart is diminished, whilst that of the vessels is increased ; so that the pulse may be, and commonly is, *small* as well as hard, the quantity of blood received at each contraction being less, from the heart partaking of debility.

Plethora produces certain derangements of action and of functions terminating at length in chronic debility ; the symptoms which manifest themselves

are, a sense of universal uneasiness and stupor. Upon inquiry, the uneasiness is referred to particular parts, as the arms and legs, or it appears to the patient to wander from one part to another; depending, no doubt, upon the attention being drawn to those parts, the mind not being capable of attending to every part of the system at one and the same time: a similar circumstance is frequently observed in fever, which is an universal affection of the whole system. This sense of stupor is accompanied by great languor, an indisposition to all exertion, and inability of performing the usual degree of muscular motion: when exercise is attempted, it is performed with difficulty, and the power of the muscles is soon exhausted.

This sense of stupor, and inability of muscular motion, have been thought to depend upon *pressure*, occasioned by the distended vessels, upon the brain or nerves ; but this does not appear to be the case. This effect, at least, could only be produced in one condition of plethora, that arising from an increased quantity of blood ; but it obtains equally in plethora caused by the morbid contraction of the vessels themselves, and when the actual quantity of blood is considerably diminished below the medium standard, when indeed there is more space intervening between the blood-vessels and the nerves. It has with more probability, therefore, been attributed to the action and reaction of the blood, and the sides of the vessels upon each other ; the latter,

not having room to contract to the extent of their present disposition to contraction, act forcibly on the blood, and produce corresponding pressure upon themselves, the uneasiness arising from which cannot be distinctly referred to its proper source by the patient. The small vessels throughout the body being filled beyond their tone, this kind of stupor takes place in the muscles through which they pass, and in consequence there is loss of muscular power.

Considerable derangement in the digestive organs is one of the effects of plethora ; the appetite is impaired, and the power of digestion diminished ; food, when taken into the stomach, occasions nausea and sickness ; great uneasiness is produced, and frequently spasmoidic contractions of the intestines and flatulency.

There is a wonderful consent existing between the organs of digestion and the vascular system, which is particularly shown in this instance. The state of the vessels is such that they will not, without considerable difficulty, receive any addition to their contents. Such is their disposition to contraction, and so great their irritability, that they are already too full, and do not require the ordinary supply of chyle and newly formed blood to support the vascular excitement; and the organs of digestion immediately become indisposed to perform their proper function, of preparing that supply; and the food which is taken in, not being properly digested, occasions great disturbance in the system.

We find the contrary state to take place under opposite circumstances:

when the vessels have been emptied considerably below that degree which constitutes proper fulness, as by hæmorrhage, or other large evacuations, and an additional supply of blood is much wanted, the appetite is very greatly increased, and the organs of digestion readily assimilate a larger quantity of food than they are accustomed to do in the ordinary state of health ; there is in this case, as it has been expressed, an appetite of the blood-vessels.

The disposition to strong contraction sometimes extends to the secretory vessels, and the various secretions are much diminished ; the urine is scanty, the skin dry, and costiveness takes place : but the contraction of the secretory vessels is not so permanent as that

of the blood-vessels, and the secretions, therefore, become irregular ; at one time being too much increased, at another time as much lessened. This holds good not only of those organs called emunctory, but applies to all the glands throughout the body, the action of which is in this affection performed with great irregularity.

That species of plethora depending upon inordinate disposition to contraction in the vascular system, it has been seen, may be produced either by those extraneous substances already mentioned, introduced into the circulating system, or may arise in consequence of certain circumstances or actions taking place within the system itself. The operation of the former may be readily

explained: applied to the vessels themselves, they act upon the irritability of the living fibre, and thus produce their effect. This description of exciting causes it will not be necessary at present further to consider; but some attention is requisite to those internal causes which are capable of bringing on the affection in question.

The two states which more commonly give rise to this disposition to inordinate contraction in the vascular system generally, (denominated chronic general inflammation,) are, first, the want of, or interruption to, the menstrual discharge; and, secondly, some local disease, as chronic inflammation, or scirrhus in a part: the irritation of extraneous bodies in a vital part, as tubercles in the lungs, is a frequent cause of this disposition in the

vessels ; which in its turn also is not unfrequently the exciting cause of inflammation and exulceration in that organ. In what manner local affection produces this general diathesis, it is not easy to comprehend ; it has been attributed to *sympathy*, but this is a word which explains nothing : to say that the constitution sympathizes with a part diseased, is employing language which does not convey any precise information. We must be contented with a knowledge of the fact, that when there exists any local disease attended with contraction of the vessels of the part, the vascular system in general at length partakes of the same disposition, and the contraction, which was before local, now becomes universal.

It might be supposed, that in the case

of obstructed menstruation, plethora arises from retention of a quantity of blood, which would otherwise be discharged ; and that therefore it is not dissimilar to that species produced by increased supply of blood from nourishing food, &c. But the cases are widely different ; the quantity of blood discharged is extremely small. It is now generally admitted that it is not a haemorrhage which takes place at the monthly periods, but a peculiar secretion ; when this fails to be produced at that time of life when nature intended this evacuation to take place, there is always a considerable contraction of the vessels of the uterus, probably the cause of the impeded secretion ; universal contraction, or chlorosis, soon follows ; and so far are the accompanying symp-

toms from indicating increased quantity of blood, that there commonly exists the most decisive appearance of inanition and want of red blood.

Local chronic inflammation, in almost any part of the system, will sooner or later give rise to this affection; but it is more certainly produced in proportion as the part which is the seat of the local disease is essential to life: that irritation, therefore, produced in the lungs by tubercles formed there, will not unfrequently give rise to the general morbid contraction of the vascular system, previous to the actual acute inflammation and exulceration of that organ. There exists probably some degree of chronic* inflammation, or, as it is some-

* The word chronic has frequently been employed, not only to denote the duration of disease,

times termed, sub-acute inflammation, attended with contraction of the vessels, which is the immediate cause of the general diathesis.

Every inflammation is attended with morbid contraction of some vessels, or set of vessels ; in acute local inflammations we frequently find the same general disposition to vascular contraction ; the pulse is *hard*, as well as full and strong. The local contraction, however, in acute inflammations, is soon removed, either by the increased action of the vessels or by the subsequent

but also its degree ; as, rheumatism, unattended with general inflammatory symptoms, is at its first attack called chronic : the same is true of inflammation ; a slighter degree of that disease in any organ, as the liver, is by some called chronic inflammation — by others, sub-acute.

stages of the disease, and the general disposition commonly subsides with it. When the inflammation terminates without the local contraction of the vessels being removed, as in scirrhus, or ulceration in a vital part, then the general contraction continues going on, producing that chronic debility which is usually the result.

It is evident, that when chronic general inflammation has, from whatever cause, been produced, all the vessels throughout the system must partake more or less of the general morbid contraction ; those local contractions of vessels, therefore, as of the vessels of the uterus or lungs, may in turn be produced by the general affection, as the general affection may be produced by the local disease. This is in no instance

more conspicuous than in the case of the uterus and the lungs ; and hence has arisen some ambiguity, and frequently difficulty, in attributing the origin of diseases of these organs to the proper source.

When the menses have been obstructed, especially in delicate habits, chronic general inflammation takes place, which, if it continues long, not unfrequently produces inflammation and ulceration of the lungs : on the other hand, when chronic general inflammation arises in consequence of disease of the lungs, it usually produces such contraction of the vessels of the uterus as to interrupt the menstrual discharge.

It has been confidently asserted that pulmonary consumption is never

the consequence of obstructed menstruation, but that in those cases where these two states are combined, the pulmonary disease has previously existed, and given rise to the obstruction. Every practitioner must have seen instances in which obstruction has taken place from some accidental cause, as cold, when no disease of the lungs had previously shown itself, and yet in some time after, the obstruction continuing, pulmonary disease has come on ; * whereas, in cases precisely similar, but wherein the menses have speedily

* See Edin. Medical Journal, vol. vi. pp. 75, 175 ; Medical and Physical Journal, vol. xxiii. p. 519, for a case of this description, and various observations in favour of and against the validity of this opinion.

recurred, no such disease has resulted.

In the former case, the chronic general inflammation produced by the morbid contraction of the vessels of the uterus has extended itself to the vessels of the lungs, and thus caused disease ; in the same manner as when chronic general inflammation is produced by pulmonary disease, it will be determined to the vessels of the uterus. It is through this medium these organs become reciprocally affected by the diseases of each other.

During the continuance of chronic general inflammation, every part of the body is liable, in different degrees, at different times, to have its vessels affected by this morbid disposition :

hence arise various local diseases, according as one or other part more largely partakes of the general disposition, although the lungs and uterus are the two organs more frequently attacked. Of these particular diseases it is not now my intention to speak, but of that general disposition which gives rise to them.

This general increased vascular contraction constantly accompanies a state of pregnancy, and in very delicate females, of scrofulous or phthisical predisposition, we sometimes find, that in consequence of this vascular contraction existing in a disproportional degree in the lungs, a foundation is laid for pulmonary disease; the increased contraction continuing in that organ, and

perhaps in the system generally, from habit, after the uterus has parted with its contents. Actual disease, however, may be delayed for a considerable time, if the processes of lactation and pregnancy rapidly succeed each other ; but after the period arrives, when children are no longer borne, it is not uncommon to see women of this description carried off by pulmonary consumption.

Inordinate contraction of the large internal vessels, although no general disposition to morbid contraction should exist throughout the vascular system generally, appears to be likewise a cause of chronic debility. Persons residing in warm climates, or who are constantly exposed to a high temperature, are commonly weak and debilitated : a

greater quantity of blood is circulated through the external vessels, and a smaller quantity than natural is contained in the internal ones, which must therefore contract more strongly to adapt themselves to this diminished quantity, and thus occasion weakness.

Of all the vital functions, that by which the tone and contractility of the blood-vessels is supported, and their contraction performed, occasions the largest expenditure of living power. So necessary is this condition of the vessels to the continuance of life, that an animal dies as soon as ever the vessels are so far relaxed as not to preserve their cylindrical shape, and adapt themselves to the quantity of blood contained. So great is the ex-

penditure of living power, in the case of this morbid contraction, constituting the species of plethora under consideration, that other parts of the system are necessarily deprived of their requisite share, and the various operations in the system are imperfectly performed, and a general state of weakness ensues.

The supply of living power being limited, this constant expenditure of it beyond its degree of reproduction, must at length totally exhaust the system, and if not timely obviated, prove fatal; even that most essential of all operations, the contraction of the large vessels requisite to maintain the adaptation of them to their contents, can be no longer supported, and life necessarily becomes extinct. In the

meantime great irregularity takes place in the performance of the various functions, and all the symptoms are successively manifested, which have been already enumerated as characteristic of chronic debility.

Having thus briefly noticed the different species of plethora, as means of exhausting the living power and inducing chronic debility, it is next in turn to consider the various debilitating causes which bring on this affection by their primary and immediate operation.

These produce their effect slowly, apparently by disturbing the balance of distribution of the living power, and occasioning an undue partial expenditure of it in some or other of the organs.

They are chiefly, 1st, Various chronic diseases. 2dly, Long-continued evacuations. 3dly, Deficient supply of nourishment. 4thly, Inordinate use of stimulants or of sedatives. 5thly, Living in an impure atmosphere. 6thly, Warm climates.

I. When chronic debility arises from the first cause, and is wholly dependent upon it, a state of disease and a state of debility being combined, it constitutes that description of affection which does not properly fall under the subject of our present consideration. When it is the *result* of disease, and exists alone, no longer depending on its cause, nor kept up by it, it does not then differ from that affection produced in any other way, and the observations applying to

chronic debility generally will also be applicable here.

It is to be noticed, however, that one description of diseases, *viz.* those of the spasmodic kind, and a state of chronic debility, are reciprocally the cause and effect of each other: in these cases, therefore, the removal of the state of debility will prove the cure of the disease; and it is sometimes the only mode by which we can accomplish this effect. The same observation will also apply to the case of long-continued intermittents.

II. The power of undue evacuation to produce chronic debility is proportioned to the nature of the fluid evacuated, as well as to the quantity discharged, and the period of its con-

tinuance. The more elaborate secretions exhaust more powerfully than those of a contrary description, because more living power is employed in their elimination : the most perfect of all the secretions, that prepared by the organs of generation, is, when too copious or too frequent, the cause of debility the most permanent and most untractable.

It has been thought that secreted fluids exhaust the strength according to the proportion in which the different constituent principles of the blood enter into their composition, or are required for their formation ; whether the living power is expended in forming the secretion itself, or in reproducing those constituent principles of the blood which

have been abstracted by the secernt organ, the evacuation is equally a source of debility, when carried to too great an extent.

Whatever be the reason, inordinate discharge from the genital organs is productive of the greatest degree of chronic debility, which, when once induced, is sometimes the only cause of the original disease continuing; more especially when such discharge has taken place with the concurrence of the will: the mental excitement contributes no small share to the production of chronic debility.

Too copious a flow of the menses, continued through a succession of their natural periods, or recurring at shorter periods than natural, is a powerful

cause of chronic debility. Whether we consider this evacuation as one of pure blood, or of an elaborate secretion, it must, in either case, when excessive, be a source of weakness. It is probable, that under the circumstances of too copious flow, the evacuation partakes partly of the nature of hæmorrhage, and partly of a secretion. Whatever may have been the original cause of the too great flow of the menstrual discharge, when chronic debility is the result, this last affection itself will afterwards keep up the preternatural evacuation, and is frequently the sole cause of its continuance.

It is no uncommon occurrence, that a copious discharge of viscid mucous fluid takes place, and continues between

the hæmorrhagic periods : like the former discharge, it is at once the cause and effect of chronic debility. Both these states offer that combination of disease and weakness which is to be removed only by the appropriate treatment of chronic debility.

Immoderate evacuation from the various glands and mucous follicles situated in the course of the intestinal tube, is also a powerful cause of chronic debility. The frequency and copiousness of the alvine discharge is, no doubt, very much influenced by the quantity of fluids poured into the canal by the different secerneent organs in its vicinity, as well as by the irritability and action of the muscular fibres of the canal itself.

As considerable diversity exists in different individuals during health, as to the state of periodical evacuation from the bowels, it may be inferred, that, in those persons in whom it takes place more frequently, there is a more copious secretion of fluids into the intestines; and the habit of this increased discharge sometimes continues for a considerable period, oftentimes during the greater part of life: but in the case of this spontaneous evacuation, no debility appears to be produced; whereas increased evacuation from the same organs, artificially procured and continued for a long period, seems to be no inconsiderable source of chronic debility.

Upon what circumstances this dif-

ference depends it is not very easy to say: probably the extraneous stimulus of the substances employed for the purpose of procuring these evacuations may produce considerable contraction of the neighbouring vessels; and it has already been noticed, that local morbid contraction, even although not very extensive, will frequently prove a source of chronic debility; the system sympathizing, as it is termed, with the local affection.

Some purgatives operate more extensively upon the neighbouring secernt organs than others. While the effects of some are confined to the mucous glands and follicles of the intestines themselves, others act by consentaneous impression upon parts more remotely situated, as

the liver and pancreas : when these latter are too strongly or too frequently stimulated by active medicines, debility is apt to follow. Although local congestion, especially of the liver, may at first be relieved by increased evacuation from the gland itself, habitual evacuation is not always the best mode of permanently curing increased determination ; the inordinate excitement of any organ is sooner or later followed by debility of that organ, by an irregular and imperfect performance of its appropriate functions. It may, perhaps, be questioned whether the *habitual* use of mercurials to improve the condition of the chylopoëtic viscera may not be, in some measure, the very cause of that debilitated state, to remove which is the

avowed purpose of persevering in the employment of them.

The urinary discharge, when containing only its ordinary constituent principles, does not appear to be at any time a cause of chronic debility, by its increased quantity, even when excited by substances capable of promoting this secretion, unless these substances possess the additional power of specific action on the system generally, as digitalis. When the secretion itself is very much changed in its nature, so as to carry out of the system those nutrient principles which are essential to the growth and strength of the body, as in diabetes mellitus, chronic debility is the certain result. Not only is the system deprived of its accustomed nutriment, but an

universal contraction of the vascular system is produced, constituting that species of plethora before described, which so powerfully induces debility. In this case a combination of disease and debility exists, which requires a regard to be had to each of these states respectively.

That the debility arising in diabetes mellitus is the consequence of the morbid condition of the vascular system, accompanying this disease, and is not produced by the mere evacuation of the nutrient particles, is probable, because in diabetes the appetite and digestion are so good as to afford an additional supply of such particles adequate to the increased evacuation; and also because nearly, if not altogether, as

much nutrient matter is carried out of the system in the milk of a woman giving suck to an infant, and yet chronic debility does not follow lactation, unless it be protracted very much beyond its proper period.

The excretory discharge by the skin, also, does not appear to produce debility by any increased quantity of the fluid evacuated. The debility which so commonly attends inordinate perspiration, as in hot climates, arises from the derangement of the balance of circulation; the blood being unduly derived to the surface leaves a less quantity in the large internal vessels, and a greater expenditure of living power is required to contract their sides, so as to adapt their diameter to their lessened contents.

III. Throughout the whole of life there is a daily and continual waste of the constituent principles of the animal frame, which requires to be met with a correspondent reparation and supply. The food taken in affords the materials of this supply, which, by various processes going on in the body, is at length converted into substances similar to the body itself, and applied to every part of the system for its support and renovation.

Should this supply be inadequate, either on account of a deficiency of food, the material to be acted on, or a deterioration of its quality; or should the powers designed by nature to vivify the matters taken into the body, so as to render them fit to become a constituent

part of the animal system, not properly perform their office, chronic debility will supervene.

The digestive and assimilative organs may be deficient in action, either from some disease attacking them, or from debility produced by some local or general cause. In the former instance, it constitutes that case of distinct disease which does not come within the scope of the present subject; in the latter it may be contemplated as either the cause or effect of chronic debility: it is as the cause alone it is now to be noticed, and that only so far as the deficient action of these organs prevents the due supply of nutrient particles being carried to every part of the body.

Whatever may be the state of the di-

gestive organs, and with whatever vigour they may perform their functions, debility will take place unless a sufficient quantity of food be made use of, proportioned to the daily and ordinary waste of the animal system. The same effect will follow when food of improper quality is employed, which, not being converted into healthy chyle and blood, becomes itself a source of irritation and a frequent cause of disease. In all these cases there is a deficient supply of nourishment, and consequent debility, from an undue exhaustion of the living power.

Chronic debility, however, in its genuine state, seldom arises solely from this cause; more commonly some distinct disease takes place, either of the organs of digestion themselves, or of

some more remote part, when the abstraction of nourishment is sudden and excessive; and it is wonderful to what extent nourishment may be gradually diminished, and yet all the functions of the system be regularly, although weakly, performed. The supply of living power may be lessened, and yet the distribution of it be regular, and the balance undisturbed.

IV. The inordinate use of stimulants is a powerful cause of chronic debility; but they seem to produce this affection in an indirect manner, first bringing on weakness of the organs or parts on which their primary operation is exerted. Of those which, being absorbed into the circulation, act upon the fibres of the blood-vessels, I have already spoken;

but there are many which, taken into the stomach, act upon the irritability of the whole system through the means of that viscus, and thus become a cause of chronic debility.

Some of these are more permanent in their effect than others. The most powerful of those ordinarily in use are high-seasoned food and vinous potations: these act more immediately upon the stomach itself, the centre, probably, and source of irritability; and when they fail to produce local disease of the organ, they not uncommonly at length give rise to chronic debility.

Disturbance of the digestive functions is one of the usual symptoms of chronic debility, however produced, as well as one of the frequent causes of that affec-

tion ; and it sometimes requires no little discrimination to assign the dyspeptic symptoms to their proper place as cause or effect. This, however, is not a matter of very great moment in a practical point of view, further than in avoiding those substances which are likely to keep up or increase the local complaint. In either case the state of chronic debility itself will require the strictest attention ; for should it even be the effect of the interruption of the digestive functions, a removal of the cause simply will not of itself be sufficient to cure the complaint : should the chronic debility, on the other hand, be the original cause of the local affection, it is evident that the cure of the debility must be a matter of the most essential importance.

The effect of sedatives in producing chronic debility seems to be more direct than that of stimulants; their primary operation tending not only to diminish the living power of the system, but to occasion an irregular distribution of it; whereby the mobility of different parts is increased, and various spasmodic affections are easily induced, the chief of which are hysteria and hypochondriasis, combining chronic debility with morbid condition ; the latter of which, however, commonly gives way on the removal of the former.

There are some sedatives which, used for a short time, tend to strengthen the system, but by a longer continuance they produce a state of chronic debility. Acids are of this description: too free a

use of them is commonly followed by weakness. The immoderate use of tea or coffee is attended with the same consequences ; although very refreshing, and perhaps highly salutary, when properly taken, yet they become, under contrary circumstances, a frequent cause of chronic debility, at once diminishing the action of the living power, and rendering its distribution irregular.

The operation of substances of this class, in producing chronic debility, is generally so gradual and imperceptible, that it is sometimes difficult to appreciate their just share in bringing on this affection. Their deleterious tendency may oftentimes be counteracted in habits of full vigour and robust strength ; it is in individuals of lax and feeble fibres,

their injurious effects are most readily experienced.

V. The purity of the atmosphere, and its contrary state, have great influence on the animal frame: whilst the former tends to strengthen and invigorate the system, the latter invariably produces weakness, and is not unfrequently a cause of chronic debility.

The function of respiration is one of much importance in the animal œconomy; and its principal use is, either, according to some physiologists, to furnish to the blood a supply of oxygen from the surrounding air, or, according to others, to discharge from the lungs a quantity of carbonaceous matter detached from the blood, the retention of which would be prejudicial to the system.

If the former hypothesis were true, it might be expected that air would be beneficial in proportion to the quantity of oxygen it contains; but experiments have proved, that the variation in the quantity of this element contained in the atmosphere at different times, or in different places, is so extremely small as to render the supply to the lungs at all times nearly equal under given circumstances.

Were the latter hypothesis true, the extrication of carbon from the blood could not be influenced by the state of composition of the atmosphere, since the extrication is a process of the lungs themselves, regulated chiefly by internal causes; unless it is contended that the presence of oxygen in the lungs is necessary

to effect this extrication by means of chemical affinity, and then the argument respecting the equal supply of oxygen at different times and places would be applicable here.

We do not, in fact, know upon what circumstances the utility of respiration actually depends. It has been said, that oxygen, when absorbed, imparts irritability to the living fibre; but irritability is also a property of the vegetable fibre, and respiration, or a process exceedingly similar to it, is going on in vegetable life: but plants throw out oxygen, this supposed principle of irritability, as a recrementitious matter, absorbing the carbonic material, which in man cannot be retained without injury.

That oxygen is necessary to human

life is evident, because no person can live in air entirely deprived of this principle; and an artificial excess of it appears to stimulate the system and its various organs to increased action: but strength or weakness of the animal system seems by no means to depend upon any variation of the proportion of this principle, so far as has hitherto been observed; and therefore the purity or impurity of the atmosphere must have reference to some other materials which occasionally enter into its mixture, and render it more or less capable of supporting or increasing the strength of the system.

I do not know that it has yet been satisfactorily determined whether the ordinary constituent principles of the

atmosphere, azote and oxygen, are in a state of chemical combination or of mechanical mixture. From the uniformity of proportion existing between them, as ascertained by the eudiometer, it is probable that they are chemically combined; yet the facility with which oxygen is said to be abstracted from the atmosphere by a clayey soil, as well as by some other substances, would show the chemical affinity between these aerial substances to be at least very weak, and easily overcome.

Mixed with the azote and oxygen are also found other aeriform fluids, certainly in a state of mechanical diffusion, as they obey the laws of their respective specific gravities. The chief of these airs are hydrogen or inflammable air,

and carbonic gas or fixed air, the former of which is constantly ascending to the upper part, and the latter descending to the lower part, of the atmospheric mixture.

The mixture of these two last airs with the general mass of the atmosphere, when they are in any considerable quantity, undoubtedly so far vitiates it as to render it less fit for animal respiration. The levity of the hydrogen leaves us little to apprehend from the prejudicial effects of that air, under the ordinary circumstances in which it is detached by any process of nature, or artificial operations usually employed in civil society ; but the latter, when detached in very large quantities, by any process, natural or artificial, may remain diffused through

the lower strata of the atmosphere, in sufficient proportion to render it less fit for respiration than it would otherwise be.

This is sometimes found to be the case in valleys so situated as not to be easily accessible to that free circulation of air requisite to promote due ventilation, and to carry off the noxious material.

In what proportion carbonic acid gas may exist in the atmosphere, so as not to form a prejudicial excess, is uncertain. It is always mixed with that fluid in some quantity, and is constantly respired by us. It may even become useful by its chemical properties in situations where large quantities of putrid vapours are given off, as it neutralizes this va-

pour, and renders it harmless. It may be taken into the stomach in considerable quantity with safety, but inspired by the lungs in excess, it speedily proves fatal. Even when largely diluted with the other gaseous constituents of the atmosphere, it is probable that the constantly respiring this substance in an undue proportion, may depress the strength, and give rise to chronic debility.

But the atmosphere is chiefly rendered impure by the presence of various foreign and adventitious particles exhaling from animal or vegetable substances, and perhaps also from mineral impregnations ; some of these are of so deleterious a nature as to produce in a short time positive disease of various descriptions, and in this case the necessity of

avoiding situations where the atmosphere is thus vitiated, is sufficiently obvious.

Others again produce their effects so slowly and in a manner so indirect, as not to be easily recognized as causes of material deviation from health, until some considerable time has elapsed: these are they which chiefly bring on a state of chronic debility, the result of a long continuance of that depression of strength which is the primary effect of the vitiated impregnation.

The interior of large towns, and the neighbourhood of extensive manufactories of various descriptions, are residences calculated by their vitiated atmosphere to bring on that depression of strength which induces chronic debility;

nor is the solitary country residence at all times free from the same inconvenience ; exhalations sometimes arise from particular soils, which are not less deleterious than those produced from the more obvious sources already pointed out ; there is no doubt that soil has as much influence on health as climate has, and the human frame is rendered more robust, or is debilitated in no slight degree, by terrestrial as well as by aerial changes.

In towns consisting of a dense and crowded population, there is, from various sources, a constant exhalation of putrid vapour, which is sometimes so abundant as to occasion actual epidemic disease, and is at all times in quantities sufficient to produce depression of

strength. The vapour constantly thrown off by an animal body, although not putrid, acts powerfully in depressing the strength. Chronic debility, therefore, is at all times to be met with among the inhabitants of populous cities, and claims no little share of attention on the part of the medical practitioner.

That different soils also contribute to vitiate the atmosphere by their adventitious impregnations, is equally certain. Positive disease is not unfrequently the result of this impregnation ; and there is reason to believe, that in situations of this description a gradual depression of strength is produced, which terminates at length in chronic debility.

What are the particular soils, and what are the different impregnations emitted

from them, it is not my present purpose to describe, but merely to state the general fact. It is evident that when these two causes are combined, the impregnation of animal effluvia and terrestrial exhalation, their effects must be more certain and extensive; the site made choice of for large towns must therefore be a matter of some importance. London perhaps enjoys a great superiority in this respect over many other cities, the soil on which it stands being for the most part dry and gravelly.

It is to be observed, however, that whatever may be the vitiation of the atmosphere from the causes just enumerated, *habit* has a powerful influence in reconciling the human body to its operation, so as to render a man less liable

to actual disease from this source, although he may not be protected from its effects in producing universal depression of strength, the forerunner of chronic debility.

The atmosphere also produces no inconsiderable effect on the human body by its mechanical qualities, its density, rarity, greater or less elasticity: the variation in these states, however, has no share in constituting the purity or impurity of the circumambient fluid. The influence of these respective qualities deserves to be considered, when change of air is recommended as one of the means employed for the cure of chronic debility.

VI. The temperature of the atmosphere has at all times a material influ-

ence on the animal frame; and it has invariably been found that hot climates have an unfavourable effect on the human body, producing gradual depression of strength, and a degree of chronic debility which is difficultly to be got the better of.

The mode in which this is effected has been already hinted at: the circulation, in consequence of the stimulus of heat, being very much increased in the exterior vessels, the large internal ones contain a less proportion of blood in them, and a larger quantity of living power is expended in contracting the vessels, so as to adapt their diameter to their contents; thus leaving a diminished supply for all the other various functions of the system.

From the stimulus of the heat, also, and the correspondent increase of circulation, more blood is returned to the heart; and this organ and the arteries act more frequently, thus expending a larger proportion of living power in performing this essential function. Respiration likewise, depending so materially on the state of the circulation, is commonly at the same time accelerated, although less salutary effect is produced on the circulating mass by this process than in cold climates, on account of the increased rarefaction of the atmosphere; a given volume containing less of the aerial pabulum, whatever that may be. Under these circumstances, then, the expenditure of the living power is disproportioned to the supply, and chronic

debility is produced by the slow operation of these causes.

The irregularity of action in the system, which usually takes place in those who are resident in hot climates, disposes strongly to, and is eminently productive of, chronic debility. In consequence of the balance of circulation being disturbed, and a disproportioned quantity of blood being contained in the exterior vessels, partial plethora is produced ; and plethora, whether general or partial, is, as has been already stated, a powerful cause of chronic debility.

This irregularity of action is also frequently the occasion of various spasmodic contractions taking place in different parts of the body, which, when

not so violent or so permanent as to constitute distinct disease, form another source of chronic debility.

The effect of climate will be proportioned to the length of time during which a person shall have been exposed to its operation. Although habit, in this respect as in others, has a considerable influence in reconciling the body to the operation of external impressions, and the transition from opposite temperatures is generally so gradual as to allow time for the system to accommodate itself in some measure to the change ; yet the invariable effect of heat is to produce that degree of external circulation, and that irritability and irregularity of action, which is the foundation of chronic debility.

Of the predisposition to actual disease on removal to a colder atmosphere, which is the usual consequence of living in hot climates, I shall not speak ; but the fact is well known, and has been frequently noticed. Similar effects, although in a slighter degree, are also produced by the transition of seasons, even in this country, when too sudden and rapid. A very hot summer of long continuance not only debilitates the animal frame to a very considerable degree, but it lays the foundation of subsequent disease, should the following season prove cold and severe : on the contrary, if this does not take place, the relaxing effects of the heat are for a length of time felt, evincing most of the usual symptoms of chronic debility.

These baneful effects of climate commonly continue for a considerable time after removal into a more temperate region, as is daily witnessed, in this metropolis, in those who return from "both the Indies" loaded with wealth, but with debilitated frames. Not unfrequently they fall victims to that change of plethora which is the immediate effect of the transition; otherwise they are subjected for a long period, perhaps for life, to all the ill effects of chronic debility.

There are various other causes, also, contributing by their slow operation to bring on chronic debility. Among the most efficient of these are anxiety of mind, intense study, too close attention to business, and the constitutional tem-

perament of the individual. The depressing passions of the mind are powerful causes of this affection ; fear, grief, and anxiety, when long continued, not uncommonly in an eminent degree produce it. Unavailing regret for past losses, and fruitless desires for unattainable objects, slowly, but with certainty, exhaust the living power. The involuntary exile and the love-lorn lass have been known to sink under the hectic of chronic debility.

But from whatever cause this affection arises, its characteristics are the same : undue contraction of some vessels, or set of vessels ; increase of irritability and mobility ; the different functions of the body weakly performed ; and irregular distribution of the living power, occasioning

in some parts inordinate, in others diminished action.

When once fully established, this affection is of difficult removal, frequently baffling all the efforts we can make to counteract it ; laying the foundation of serious and intractable diseases, dyspepsia, various spasmodic complaints, and a host of nervous affections ; or in combination with them, so modifying their character, as to render the ordinary and accustomed treatment of them ineffectual while the debility remains. Continuing generally for a long period after its exciting cause has been removed, it requires a steady and persevering application of the means of cure, which must be often varied according to the state of the patient, or the

circumstances of the origin and progress of the affection.

Of some of the most appropriate and effectual remedial means, I am now to speak.

The most obvious indication to be pursued in commencing the treatment of chronic debility, is, undoubtedly, to remove the exciting causes of this affection, when it is still kept up by their continued application. When it is the result of long-protracted disease, the removal of this is sometimes of primary importance; but it happens not unfrequently, that chronic debility itself is the cause either of the origin or continuance of disease, and it becomes requisite to remove this affection, as the means of curing the disease,

and restoring the system to perfect health.

Although, also, the debilitating causes which originally produced this affection shall have been discontinued, the chronic debility will for a long time remain. It is under these latter circumstances the subject is now to be considered, *viz.* the treatment of chronic debility, however produced, when it of itself forms the chief obstacle to a return to the ordinary health and strength of the individual.

There is one variety, however, of this affection, which demands a separate and distinct consideration, *viz.* chronic debility, the result of plethora; as our means of cure are first to be directed to the removal of that state of the

vascular system which produced and which keeps up the debility.

When plethora arises from too great a supply of nourishment afforded by high living, or an inactive and sedentary life, the remedy is obvious, and the only caution requisite, is, that whatsoever change be made, it shall be effected gradually ; abstraction of blood from the system is sometimes useful in these cases, as a preventive of threatening mischief, but is prejudicial, if relied on as a means of cure, unaided by that abstinence and exercise which can alone be effectual for its permanent removal.

I have already said that the plethora depending upon an increased quantity of blood is very likely to produce actual disease, as inflammation or hæmorrhage ;

it is that plethora depending upon the peculiar disposition in the blood-vessels which is the more common cause of chronic debility. When this state is produced and entirely kept up by acrimonious substances absorbed into the blood-vessels, as pus, or by sympathetic irritation, the consequence of local disease, as scirrhus or cancer, there exists that combination of disease and debility in which all treatment of the latter would be ineffectual during the continuance of the former.

But chronic debility arising from that state of plethora produced by a suppression of the menstrual discharge, and depending upon the interruption of that function, not unfrequently becomes in turn itself the sole cause of the con-

tinued suppression ; and the first step to reproduce the evacuation, is to remove the debility by such a modification of treatment as I am now to point out.

When the period arrives in which the menstrual discharge ought naturally to take place, should this evacuation be prevented by any cause, either external and accidental, or internal, depending on the peculiar state of the uterine system in the individual, or should it be interrupted after having a few times occurred, this disposition to universal contraction of the vascular system comes on, which, with the other appearances usually accompanying it, has been called chlorosis.

In females of naturally weak and de-

licate constitutions, symptoms of weakness manifest themselves much earlier than in those of more robust and hardy frames ; in these latter, the plethora induced puts on more the appearance of that species arising from increased quantity of blood, owing perhaps to the vigour with which sanguification is generally performed in habits naturally strong—at least there seems to be here a combination of the two species. From the tendency with which the latter species is accompanied to produce an inflammatory or hæmorrhagic diathesis, such a state of the uterine vessels frequently takes place, and the menstrual discharge is restored by the efforts of nature.

When the constitution, on the other

hand, is naturally weak and delicate, no such efforts are produced. Sanguification, in common with all other functions, at all times weakly performed in such a constitution, is now still more imperfectly accomplished; no superabundance of blood solicits discharge from the system; the disposition to contraction in the vascular system increases in proportion to the continuance of the suppression; and these states are mutually related to each other as cause and effect, producing together a state of chronic debility, which prolongs the existence of each.

The continuance of the suppression, then, depending upon two distinct causes,—the contraction of the vascular system operating on the particular ute-

rine vessels, and a want of force in the propelling powers to overcome the resistance offered,—we have two indications to perform: to diminish the disposition to contraction in the vessels, and to impart strength to the general moving powers. In what degree these indications are to be combined, or whether either may be trusted to alone, are questions which can scarcely be determined without a consideration of each individual case.

In the earlier stages of this affection, perhaps, the disposition to vascular contraction may be overcome by temporarily weakening the action of the sanguiferous system by an evacuation of blood, the utility of which will be in proportion, not to the quantity drawn, but to its immediate effects upon the vessels;

it sometimes happening, even from a very small quantity suddenly taken, that such a change is produced in their action as to prevent a return of this morbid disposition, at least for some time, during which, means may be employed for removal of the original cause, the suppression.

In strong and robust habits, particularly, this evacuation is serviceable, as the plethora, partaking in a great degree of that species depending on quantity, is eminently relieved, and together with it also the disposition to contraction; so that the sanguiferous system being restored to its natural and healthy state, the menstrual evacuation follows in due course, or is easily induced.

In persons of more weakly frames, should we succeed, by blood-letting, in

suspending for a time the disposition to inordinate contraction in the vascular system, an opportunity will be afforded of exhibiting stimulants and tonics to produce the natural discharge. When, however, this disposition has continued for a long time, is partly kept up by habit, and has produced a very great degree of debility, it becomes a question, whether blood-letting is at all admissible, and whether it will not aggravate, instead of lessening, the mischief?

In cases of this latter description, we are compelled to confine ourselves to the exhibition of such medicines as have a tendency to act upon the uterine vessels, by their stimulant and tonic powers, and, by reproducing the natural evacuation, remove the original cause of the morbid affection.

There is often, however, no inconsiderable difficulty in carrying this intention into effect. Not only will the best selected medicines frequently, under these circumstances, fail in their operation ; but when they do answer the end for which we prescribe them, they most commonly increase for a time the morbid disposition to contraction, and aggravate the symptoms we wish to remove. To increase action where action is already inordinate, may not seem to be very appropriate ; but it is the method frequently pursued by nature, and we seldom perform our office more successfully than when we become her humble imitators.

The combined exhibition of stimulants and tonics in cases of this description, answers better than medicines of either

class singly ; even when we can succeed in removing for a time the existing debility by tonics alone, the menstrual discharge is not reproduced, and the vascular contraction continuing and even increasing, the symptoms of weakness again recur with increased violence.

The menstrual discharge is said to be always preceded by some inflammatory disposition in the vessels of the uterus, which, first pervading the whole system, has been at length determined to this particular organ. Stimulants given alone to bring on this disposition require a longer time to produce their effect on the uterine system, than when thus combined ; and during this period the inflammatory disposition may preponderate in some other other organ, as the

lungs, and thus lay the foundation of serious and incurable disease.

The stimulants usually employed are such as possess a degree of antispasmodic power, tending to take off the disposition to contraction of the vessels, as assafoetida, sagapenum, myrrh, &c. while the circulation is to be determined as much as possible to the uterine system, by the constant, but gentle operation of those purgatives which favour congestion in the vessels supplying that organ, assisted by the relaxing powers of local warm bathing and other emollients.

The tonics we make choice of to combine with these stimulants should be such as possess the least astringent power; astringents having a tendency to restrain the menstrual flux. The bitter astringents,

therefore, unless they are required temporarily to strengthen the tone of the stomach, are seldom employed for this purpose; but metallic preparations, whose tonic power overbalances their astringency, are usually preferred. The *mistura ferri composita* of the London Pharmacopœia maintains a high reputation as a composition of this description; but in cases like these, whatever medicines we give will require to be variously combined and frequently changed.

The morbid disposition to contraction, which in these cases originates probably first in the uterine organs, and is thence communicated to the vascular system in general, is very apt to be transferred in an excessive degree to the

lungs ; obstructing the free circulation through them, and producing irritation, which proceeds at length to inflammation, commonly of the subacute kind in the beginning, but terminating ultimately, if not arrested, in disorganization of the structure of the organ itself.

When the local affection is thus extended to two organs, both of much importance in the animal œconomy, the plethora arising from inordinate vascular contraction is greatly increased, and the consequent debility rapidly augmented. A combination of disease and debility then exists, which offers no inconsiderable difficulty in the treatment of it; but even under these circumstances it is generally advisable to employ means to remove the debility of the system,

whilst those local measures which are calculated to obviate further organic mischief must not be neglected.

The reproduction of the menstrual discharge, when this can be effected, will generally be the commencement of the cure ; yet some doubt may be entertained how far it is proper to give stimulants which act upon the system generally, lest the local affection of the lungs should be thereby increased. General blood-letting, for the purpose of arresting the pulmonary affection, increases the debility, in causing a greater expenditure of living power by the vessels in their still further contraction upon their diminished contents. When we can succeed in obviating local mischief by local treatment, we may have less hesitation in

employing combined tonics and stimulants as general remedies to effect our intentions.

We know by experience, that the plethora arising from obstructed menstruation has a tendency at length to wear itself out ; it must be our endeavour in the meantime to remove the consequent chronic debility, and to protect the vital organs against the accession of positive disease.

Chronic debility, arising from plethora, the effect of morbid disposition to contraction in the vessels, is commonly attended with greater emaciation than any other species of it. So great sometimes is this contraction, and so increased is the irritability of the fibre, that the vessels pertinaciously refuse, as it were, any addition to their contents from the

ordinary supplies of chylification and sanguification ; even the attempt to introduce nutriment produces disturbance, and such inordinate action as still further increases the debility.

Under these circumstances, whatever food is attempted to be given must be of the mildest description. The acid sedatives are frequently useful in allaying this excessive action and irritability, enabling us to introduce more nutriment into the vessels ; thereby rendering a less degree of contraction of them necessary, as their contents become increased, and at the same time supporting the strength. In proportion as we can change the plethora of inordinate contraction for the plethora of quantity, we shall be more likely to succeed in our endeavours

to restore the system to that state in which the menstrual flow may be more readily reproduced.

In chronic debility all the functions are weakly and imperfectly performed, but not in an equal degree. There exists between the various organs and parts of the body a power of reciprocal influence, by means of which the debility of one part is communicated to others, in proportion to the extent of this influence which exists between different organs. This reciprocal influence is not regulated by the nearness or distance of parts; organs the most widely separated sometimes exerting it in the most eminent degree.*

* This reciprocal influence is badly expressed in medical language by the term *sympathy*, a word

The stomach is an organ which possesses this reciprocal influence in a very great degree, communicating to, and participating in, the strength and debility of a great variety of other parts. It generally therefore becomes affected in cases of chronic debility, whatever organ may have been originally implicated,

which conveys no notion either of its nature or mode of operation, of neither of which, indeed, do we know any thing. It is one of those conditions of the animal system which is coeval with and dependent upon life, no more to be explained than the magnetic or the planetary influence, one of which it may perhaps resemble. "May not," says an able and learned author, "the influence be similar to that which exists between the earth and sun, or any other substances which act on one another without any apparent connexion by matter?"

—*Dr. Geo. Fordyce's Elements of the Practice of Physic.*

and the debility is more extensively diffused through the medium of its influence. The functions also of this organ are so important and so essential to the maintenance of the strength and support of the system, that whenever they are interrupted, from whatever cause, debility must necessarily ensue and increase; so that, whether primarily or secondarily affected, the state of this viscus demands a considerable share of attention.

In consequence of the reciprocal influence existing between this organ and all other parts, remedial means applied to the stomach exert their power over the whole animal œconomy; and the stomach is thus the centre from which the specific effects of medicines are disseminated through the system at large.

To restore the functions of the stomach to their natural and healthy state, is an indication of primary importance, whether chronic debility shall have originated in this organ, or have been subsequently extended to it. The strength we are able to impart to this viscus will, by the extensive reciprocal influence it maintains, be communicated to every part of the system.

When the digestive organs are affected with more than their proportionate share of debility, which is frequently the case when the debilitating causes exert a direct operation upon them, it will be requisite to adopt some treatment appropriate to the local affection, in addition to those means of imparting general strength intended to act upon this organ

as a centre, through the medium of which every part is influenced. Indeed, very commonly, all strengthening remedies will fail of producing their effect while the digestive organs are in this deranged state.

When digestion is weakly and imperfectly performed, not only are the various parts of the body debilitated by the reciprocal influence of the organ itself, but the due supply of nourishment is interrupted, and the whole system is weakened in a still more positive manner from the want of this supply. To enable the digestive organs, then, to perform their proper functions, by remedies operating locally, constitutes our first curative intention.

The secretions poured out into the

stomach by the glands subservient to this organ become changed and vitiated, and the food taken in undergoes, for want of the adequate control of the living power, some of the fermentations to which it is subject out of the body. The stomach, therefore, becomes loaded with acid fluid and viscid mucus, and sometimes with semiputrid colluvies, which produce considerable disturbance in the process of digestion, and which it is necessary to get rid of, as well as to prevent a re-accumulation of them.

For the first of these purposes an emetic is serviceable, which not only evacuates the contents of the stomach, but appears also to exert some further effect on the secernt organs, in ame-

liorating the secretions, and enabling the stomach to perform its office with more vigour.

This effect is still further promoted by afterwards administering a solution of some of the alkaline salts, which, by neutralizing whatever portion of acid may still be evolved, and combining with the viscid mucus poured out by the glands, obviates the mischief apt to arise from the presence of these noxious matters in the stomach; while care should be taken to cleanse the whole *primæ viæ* by the action of such gentle laxatives as are just sufficient for this purpose.

Much attention is requisite under these circumstances to the quantity and kind of food employed; the stomach fre-

quently being able to digest a certain portion, when the smallest excess beyond this would occasion great disturbance, and completely interrupt the process of digestion. The same thing is true as to the quality of food. While one kind is well adapted to the present state of the organs of digestion, a different kind would occasion much disturbance, and aggravate all the symptoms of indigestion.

Anxious inquiries are often made as to the wholesomeness and unwholesomeness of various articles of food. Every article of food may be said to be wholesome when the powers of the system are in sufficient vigour to convert it into chyle and blood, which do not at all differ in their proper-

ties, from whatever materials they are formed.

Some physiologists have fancied that animal food, as it contains a large proportion of azote, is more easily assimilated to the animal fibre than vegetable food, which is destitute of this principle; but there does not seem to be the least foundation for this opinion, as the chyle is precisely the same in its properties, from whichever food obtained; and it is the chyle which is assimilated to the animal structure, not the food in its original state. Besides, animals living entirely on vegetable food, as the ox and horse, have as strong and vigorous muscular fibres at least as man.

The wholesomeness of food, therefore,

is entirely relative to the present state of the digestive organs ; and the power of these organs differs in different individuals, so that the food which by one person would be perfectly digested and converted into chyle and blood, will in another stomach, from a weakened state of the digestive functions, undergo the fermentations natural to it when uncontrolled by the living power, and thus become a source of disturbance, instead of a source of nutriment.

Experience alone can determine with precision the kind of food best adapted to any individual ; yet some general rules are applicable to this subject ; and in cases of debility of the stomach, it becomes a matter of importance to adjust the quality of the food to the powers of digestion.

It is necessary that the food should be detained a certain time in the stomach to undergo the action of that organ and its secreted fluids. Liquid aliment affords less nutriment than solid,* because the greater part of the former is absorbed, or otherwise escapes, before that purpose can be accomplished; yet solid food of too hard a texture, or in too large masses, does not readily undergo that gradual solution, whether mechanical or chemical, which is the first step in the digestive process. Nature, therefore, has provided a mechanical apparatus,

* Milk, although fluid, in its natural state, may in this view be included in the list of solids, because it is always coagulated in the stomach into a solid previous to its being digested. The same thing is true of some other substances, which also undergo this process in the stomach.

(the teeth,) by which the food may be so divided as to be introduced into the stomach in solid particles, and yet those particles be in a state of great minuteness.

A part only of the solid food thus introduced into the stomach is converted into chyle and blood; part being carried out of the body in an excrementitious state. The portion of it converted into chyle and blood consists chiefly of animal and vegetable mucilages: these are found in the animals and vegetables employed for food in various states of combination, and variously admixed with other principles, rendering them more or less prone to the natural fermentations, the saccharine, vinous, acetous, and putrefactive.

The living power of the stomach, when in due vigour, controls these fermentations, and prevents their taking place within the body; but when the living power is weakened, these fermentations are apt to arise, even with greater facility than out of the body. It becomes of importance, therefore, in cases of debility, to administer for food these digestible mucilages in a state of as great purity as they can be obtained, free from the admixture of those adventitious principles which are most prone to run into fermentation, and are less easy to be controlled by the living power in its weakened state.

This is the foundation of our selection of articles of food: for instance, the farina of all the different vegetables

containing this substance is precisely the same when obtained in its pure state, from whatever plant it is procured; yet is it so variously combined with other principles in different plants, as to be separated from them by the stomach with very different degrees of facility. In proportion to the state of purity in which it is exhibited, it is best adapted to the process of digestion; not that the produce of it, when digested, at all differs, but that less disturbance is produced during the process.

The same is true of animal mucilage: the more simple its state of combination, the more readily digestible it is, and the less is the disturbance produced.

Other substances than these mucilages, or rather, perhaps, these mucilages under

more complex states of combination, are capable of digestion in the human stomach, as expressed oils and sugar; but when employed as food, they require the digestive powers to be in considerable vigour.

The solvent and coagulating powers of the gastric juice are in proportion to the strength and vigour of the digestive organs. When these are weak, therefore, it becomes of great consequence to choose such food as will most readily undergo these processes at the least expense of living power.

The action of the digestive organs upon the farinaceous matter of vegetables is much facilitated by previous coagulation of that matter by heat and fermentation, rendering its solution in

the stomach less viscid than it would otherwise be. The facility of digestion also of animal mucilages appears to be in an inverse ratio to their viscosity. Hence young meats, as veal and lamb, are more difficultly digested than beef and mutton, when these latter are not so old as to contain a large quantity of essential oil, which substance in excess produces disturbance in the stomach, and interrupts the process of digestion.

It is not my intention to enter into any detail of the comparative preference of different articles or kinds of food, but merely to point out the principle of their selection. The greatest portion of nutriment is not always obtained from the most nutritious diet, but from that which is best adapted to the present state of

the digestive organs; nor is the actual quantity of nourishment acquired by the system always in direct proportion to the quantity of food employed. When more is exhibited than the digestive organs, in their present state of vigour, are capable of converting into chyle and blood, the superfluous quantity undergoes some process to render it capable of being thrown out of the body through some of the emunctories, at a great expense of living power, which still further increases the state of debility.

It is to be observed, that custom and habit have considerable influence upon the stomach in enabling it to accommodate itself to a great diversity of circumstances in employing food both as to quantity and quality.

In chronic debility the stomach may

be strengthened by the same remedies which impart strength to the system in general; indeed, for the most part, this general strength is communicated through the medium of that viscus, upon which most if not all internal medicines exert their first impression, and through the influence of which their beneficial effect is produced on other organs.

In administering medicines for the cure of chronic debility, we have in view to produce some effect, not on the mechanical structure of the animal machine, nor on the chemical composition of its solids or fluids, but upon the action of the living power; to diminish its expenditure, to increase its quantity, or to regulate its distribution.

There are some medicines which, by

their operation on the system, directly diminish the action of the moving powers ; others which diminish the irritability of these powers, rendering them less easily excited into action by their appropriate stimuli ; others, again, which diminish the mobility of parts, rendering them less prone to those irregular actions which are either spontaneous or excited by slight association ; and there are still other medicines which impart strength to the moving parts, increasing their tone and vital attraction.

Very frequently two or more of these powers reside together in the same substance ; we commonly, indeed, employ fewer or more of them in conjunction in our treatment of chronic debility.

The living power being expended chiefly in performing the various actions of the system, and these in chronic debility being always disproportioned to the supply of living power, it is an essential point to diminish excessive action, which may be done by different medicines internally exhibited.

The action of the heart and blood-vessels being that which expends the greatest quantity of living power, and this being always in a state of morbid excess, either universally or locally, in chronic debility, or the disposition to such action being in too augmented a degree, our first object of inquiry is, what substances have the power of diminishing this action or disposition?

I have already adverted to the means

of diminishing action when chronic debility is produced by, and depends on, that species of plethora arising from morbid disposition to contraction in the blood-vessels. In other cases, when there does not exist this general state of plethora, as when the affection is produced by excessive evacuation, there is always an increase of irritability in the system, which renders every part of it more readily or easily acted upon by causes exciting to action; so that inordinate action of some part or other commonly takes place; generally the frequency of the circulation is much increased, and the living power is thereby rapidly expended.

The increased frequency of the circulation may in some measure be

moderated by medicines of the class called sedatives; but there are not many of that class which are well adapted to the purpose. Such of them as by their properties diminish the irritability at the same time, are the most useful, and more particularly when they have an antispasmodic virtue joined to them. The narcotic sedatives are the least proper of all to be employed in chronic debility, except in cases where the sensibility of the system, or of some part of it, is morbidly increased.

Among sedative remedies the acids are the most serviceable when exhibited in chronic debility, and they commonly answer several useful purposes. The stimulus of digestion is, in debilitated

people, a source of irritation to the sanguiferous system, and the circulation is in them always very much increased during this process. Acids have a powerful tendency to diminish this stimulus, and consequently by this means they contribute to lessen the expenditure of living power in the action of the vessels.

Mild acescent fruits, when easily digested, are on this account proper articles of food. When these run into a state of fermentation in the stomach, the mineral acids exhibited before meals may be useful. These latter also appear to have some effect in lessening the circulation on the surface of the body, and thus, in consequence of more blood being determined to the internal large vessels,

less expenditure of living power is requisite to contract them upon their contents.

The mineral acids, also, are frequently serviceable in chronic debility as astringents ; but the action of this class (astringents) will be adverted to hereafter. Of all the mineral acids, the sulphuric is the most grateful, and perhaps the very best preparation of it is Mynsicht's Elixir of Vitriol—a formula which has, unaccountably, been rejected by the London College.

The stimulant powers of wine are often made use of for the purpose of assisting digestion, as it excites the stomach to temporary increased action. In some cases such a practice may be serviceable ; but when thus employed,

it is best taken *after*, not *with* the meal. In the latter case it stimulates the appetite, and occasions a greater quantity of food to be taken into the stomach, by which the digestive organs are oppressed. The utility of the constant and daily use of wine may perhaps be questioned ; but they are undoubtedly in error who would enforce the indiscriminate prohibition of this cordial.

Considerable benefit is frequently derived from taking tea or coffee at the latter period of the digestive process ; these liquors having a powerful tendency to diminish the stimulus imparted to the vessels during this process. When taken to excess, however, and as is sometimes the case without a due proportion of solid food, they are extremely pre-

judicial, increasing the mobility of the system, and still further augmenting the debility.

Among the medicines employed as sedatives, with a view of taking off the morbid contraction of the blood-vessels, perhaps no one is more entitled to commendation than sarsaparilla. When the morbid contraction has been produced by the action of stimuli, as when mercury or guaiacum has been long administered, this substance may be given with great advantage; and in those cases wherein the morbid state of the vessels arises from the influence of local disease, as in hectic fever from pulmonary affection, this medicine is productive of considerable benefit. Some difficulty has hitherto been ex-

perienced in obtaining its virtues in a sufficiently manageable state; but the preparations of it lately offered to the public appear to obviate this objection.

It might at first view be supposed, that in cases of chronic debility attended with morbid contraction of the blood-vessels, relaxant medicines, as antimony, &c. would be given with advantage; but this is by no means the case. The relaxant effects of this class are chiefly exerted upon the capillary vessels, and the balance of circulation is thereby thrown upon the surface; consequently the large internal vessels being emptied to a still greater degree, a larger expenditure of living power is requisite in contracting them upon their con-

tents, and the debility is thus augmented.

Various medicines are employed with a view to diminish the irritability and mobility of the system, which are always morbidly increased in chronic debility. Among these the class of sedatives, already mentioned, may in some measure be ranked. Those medicines, also, which specifically impart strength and tone to the animal fibres, produce indirectly the same effect; it is seldom, indeed, that we do not combine these several intentions in administering our remedies.

Most of the individual medicines contained in each respective class possess, in a greater or less degree, the properties of the other classes. To diminish morbid

irritability and mobility is indirectly to impart strength : to increase the tone and vigour of the living fibre is indirectly to diminish morbid irritability and mobility. The whole of these medicines may be comprised under the two general heads of astringents and tonics.

In chronic debility, on account of the increased mobility of the system, spasmodic action of some of the vessels, or of some of the muscles, is apt frequently to take place. These spasmodic affections may often be temporarily relieved by medicines of the antispasmodic class, although their power of diminishing mobility is slight, and the disposition to this affection is more certainly obviated by those medi-

cines which impart strength to the system generally.

There is usually, under all circumstances, naturally a greater degree of mobility in women than in men ; and this disposition is much increased by a state of debility. Hence the frequency of hysteria and other irregular spasmodic affections in them, in which medicines neither astringent nor tonic, but pure antispasmodics, as camphor, æther, and volatile alkali, may be usefully employed ; yet the power of these medicines is very uncertain, as they sometimes produce an instantaneous effect, and at other times appear not to have the least action whatever.

When there is a great increase of sensibility, as well as of mobility, opium

is a valuable antispasmodic. It acts also as an astringent, restraining inordinate evacuations ; and it diminishes for a time the irritability of the system, and by its primary action imparts strength to the muscular fibre and vessels, increasing their power and force, but not their frequency of action. The employment of this substance, however, in chronic debility, requires considerable caution ; and it is, upon the whole, generally better to restrict its use to the alleviation of present uneasiness, whilst the diminution of the irritability and mobility of the system is confided to the appropriate remedies, tonics and astringents.

Wine is a valuable antispasmodic as well as tonic, somewhat analogous to opium in its action ; but its employ-

ment for either of these purposes requires skill and discrimination. Its beneficial action is commonly temporary, and is sometimes succeeded by an increase of debility, in consequence of its undue stimulant action ; yet it may be so managed as to secure its anti-spasmodic and tonic virtues in many cases of this affection.

Astringent substances act upon the dead animal solid and upon the living fibre, and their mode of action upon each is partly analogous, contracting the length and diameter of the fibres, and depriving them of their water of combination. This operation on the dead fibre is called *tanning*, and the analogous effect on the living fibre is the result of chemical action, and requires the actual

contact* of the astringent substance with the part.

But employed as internal medicines, astringents act upon the moving and irritable parts of the system through the medium of the living principle, independent of local application or actual contact, and produce universal contraction of the muscular fibres, increasing their power, and rendering them capable of stronger action.

By contracting the capillaries, they throw more blood upon the internal large vessels, and thus the circulation is performed with a less expenditure of the living power; by the contraction of

* To speak in ordinary language, although it is not philosophically true.

the secretory organs, they lessen inordinate secretions, and hence diminish the waste of living power. Their action on the blood-vessels restrains haemorrhages, when arising from the relaxed state of the vessels of a part ; and by their action on the exhalants they restrain inordinate discharges of every description.

Given for a short period and in moderate quantities, they produce beneficial effects upon the system ; but their long-continued employment is prejudicial, as after a time they lose their power, and at length contribute to increase debility.

From the effects of astringents, as here enumerated, it will be seen that the employment of them is calculated, in no inconsiderable degree, to strengthen the system both directly and indi-

rectly ; and many of the individual substances included in this class are also uniformly ranked among the tonics, especially those astringents derived from the mineral kingdom. Most of the simply bitter vegetables may be employed as astringents, but some few of them possess narcotic and sedative properties, which render them unsuitable in cases of debility. We must be directed in our choice of the individual substance by the nature of the causes, or the prominent symptoms, of the state of debility.

When chronic debility is produced and kept up by undue evacuation or inordinate discharge, or when these are the result of a debilitated state, astringents will be highly serviceable ; and

those derived from the mineral kingdom, as the acids, alum, and various metallic preparations, demand the preference. In cases accompanied by great increase of irritability, the vegetable bitters may be better adapted. Oak bark is perhaps one of the most efficacious vegetable astringents; but among these none stand more pre-eminent for acknowledged efficacy than the cinchona, or Peruvian bark; uniting in itself a strong astringent property, with a considerable specific power of diminishing irritability.

In all cases of great relaxation, medicines of this description are clearly indicated; but when chronic debility is attended with universal vascular contraction, their utility becomes at least questionable, and it will, upon the

whole, be best to confine ourselves to the different acids. When vascular contraction is more local and partial, diminishing the irritability of the system by medicines of this class may frequently be the means of preventing the morbid disposition to contraction from being communicated to the whole of the vascular system.

The chemical action of astringents upon the animal fibre is permanent; they not only deprive it of its water of combination, but they render it incapable of again recombining with that fluid. Their action upon the system, through the medium of the living principle, is, on the contrary, temporary, and the effect of them is much diminished by a continued and habitual use of them.

Those medicines which diminish irritability generally, and render the moving parts less easily acted upon by stimuli of every description, and thus prevent inordinate action, necessarily increase the strength of the system, by occasioning less waste of living power than would otherwise be the case. But there appears to be also a class of medicines which possess the property of directly increasing the quantity of living power in the system, or of equalizing its distribution, and these are more particularly called tonics.

Of the mode in which they effect this, we have not any very accurate knowledge; only we are certain that it is not by any mechanical or chemical effect upon the animal solid, but by some

influence exerted through the medium of the living principle itself.

The ultimate effect of medicines of this description is to increase the attraction* of life between the particles of the living solid, so as to enable the moving parts to exert an increased degree of

* It may appear almost unnecessary to repeat here what is so generally known — that no two particles of matter are in actual contact, but only in a state of approximation ; and that the influence of the respective particles of matter over each other is exerted at a greater or less distance, and consists in *attraction* of different kinds : some more general, as the attraction of gravitation, which is equal and uniform in all bodies whatever, and exerted at all distances ; the attraction of cohesion, constituting the form and size of identical masses ; the attraction of affinity, determining the species and composition of substances ; and some more limited in their operation,

force when brought into action, and this with a less exhaustion of living power, inasmuch as the actual contraction of a moving part in performing any motion, must be less in proportion as its particles are already in a greater degree of approximation; for, as has been before observed, the action of living parts is performed by an original power of motion inherent in them, which is no other than vital attraction between the ultimate particles.

If a vessel whose sides occupy a space the diameter of one inch, has to contract upon a column of fluid of half an inch

and confined in their extent, as magnetic attraction and vital attraction, or that subsisting between the particles of living matter, bringing them into a closer approximation than when deprived of life.

diameter, more living power will be exerted in bringing its particles into the requisite degree of approximation, than if by the employment of tonics the diameter of the vessel could be previously reduced to three-fourths of an inch ; and the same thing is true of muscular contraction of every description.

Vital attraction then seems to exist between the particles of the living solid, whether in a state of rest or of motion, but in different degrees. The former might be called the attraction of quiescence, the latter the attraction of contraction ; and in proportion to the extent of the former, is usually the force of the latter.

The class of tonics is a very numerous

one ; many substances, both in the vegetable and mineral kingdoms, possessing, when internally exhibited, the property of increasing the permanent attraction of the particles of the living solid. The vegetable bitter astringents, and several of the metallic salts and oxyds, are usually employed for this purpose. It is not my intention to enter into any discussion on the comparative merits of the different substances made use of as tonic remedies, but to offer a few remarks on the general principles which should regulate their exhibition.

The primary action of stimuli upon the moving parts appears in some respects to resemble that of tonics, *viz.* to increase the vital attraction, by the operation of which alone motion is

produced. But there exists this remarkable difference in the effect of the two; that whereas the attraction of contraction produced by stimuli is *alternate*, the vital attraction caused by tonics is *permanent*, without alternation;* and it is this permanent increase of attraction which constitutes strength, whilst alternate contraction is attended ultimately with exhaustion of the living power. In proportion, therefore, as medicines employed as tonics are divested of any stimulant property, will be the efficacy resulting from their exhibition.

Many medicines possess a tonic and

* In other words, one set produces action, the other tone; both these states being the effect of attraction between the particles of the living solid.

a stimulant power combined, yet may they be so exhibited as in a great measure to ensure the former effect to the exclusion of the latter. This is the case, for instance, in several preparations of iron. Given in a certain dose, or in certain states of concentration, they act as stimulants, increasing action and exhausting the living power. By a diminution of the dose, or by a diffusion of the same dose through a larger proportion of a fluid vehicle, the tonic effect is secured, whilst the stimulant property is rendered nearly or altogether inert.

The chalybeate mineral waters, in which the quantity of iron is very minute, are commonly more efficacious as tonics than larger doses of that metal in a more concentrated state; and it is worthy of

observation, that the specific effect of most medicines is destroyed by increasing the dose beyond what is just sufficient to secure the specific effect, converting them thereby into simple stimulants. Thus the sulphate of iron, which in small doses produces its specific effect of a tonic, becomes in a large dose a simple stimulant, acting upon the stomach and intestines so as to occasion vomiting and purging. The management of the *doses* of remedies is perhaps one of the principal *arcana* in practical medicine.

In cases of chronic debility arising from, or accompanied by, profuse haemorrhagic or other discharges, it will be proper to employ medicines possessing both an astringent and tonic power, whilst the stimulant property, if they

possess such, is to be more carefully guarded against. Most of the vegetable bitters possess an astringent virtue which renders them serviceable under these circumstances ; and much benefit commonly accrues from uniting with them some of the metallic tonics, the stimulant powers of which latter are in a great measure compensated by the inherent property of the vegetable bitters of diminishing irritability in the living solids, rendering them less easily excited by stimuli. The combined power of astringents and metallic tonics is frequently more efficacious than either singly.

Much advantage is often obtained in cases of debility by employing different tonics in succession, and variously com-

bining them. The specific effect of any individual medicine sometimes becomes diminished by continued exhibition, perhaps from the system being reconciled by habit to its impression. The changing it for some other medicine of the same virtues, or combining it with others of like or even different powers, is more efficacious than increasing its dose ; as in the latter case we frequently convert it into a simple stimulant, and do not increase its specific powers. The principles of the combination of the specific powers of remedies is a subject which deserves to be well studied by those who are desirous of becoming proficients in practical medicine.

Cold applied to the surface of the body in a moderate degree strengthens

the system, and may be reckoned among the tonics useful in chronic debility. The constant application of it is more efficacious than the occasional employment of it; atmospheric air of a cool temperature than a very cold bath. This latter incautiously taken in cases of great debility, exhausts the strength by the reaction it occasions, and becomes very prejudicial. By proper management, however, and a gradual reduction of temperature, it may be made a valuable auxiliary in the treatment of chronic debility unattended with any positive disease which forbids its employment; as the increased circulation produced by it takes off any preternatural contraction of the vessels, which, while it exists, is frequently the cause of the continuance of the debility.

It is evident that the efficacy of bathing, whether warm or cold, depends materially upon a proper regulation of the temperature of the water and the period of its application. No general rules adapted to the various circumstances of individual cases can safely be given ; the regulation both of temperature and periods must be left to individual discrimination.

As an impure atmosphere is efficient in producing chronic debility, so is pure air one of the remedial means successfully employed for its removal. To avoid situations in which the air is contaminated by deleterious impregnations, is a measure sufficiently obvious ; and it will therefore be prudent to shun the neighbourhood of large towns and extensive manufactories, where such con-

taminations usually exist. Clayey soils and marshy grounds must also be carefully avoided, which are rendered still more unhealthy in situations subject to much rain, because the vapours unfit for respiration carried down by the rain being retained with it on the surface of the former description of soil, again exhale in a more concentrated state; and in marshy grounds extensive putrefaction takes place, and a great quantity of impure air is emitted.

A gravelly, or chalky, or loose rocky soil is on this account to be preferred, because the water is enabled to penetrate below the surface of these materials, and to carry with it the impure vapours. On such a soil rain purifies the air very much, and we frequently

find a moist climate, when not of too low a temperature, by no means prejudicial to health. A river or a running stream, when passing through a soil of the above description, is one of the most efficacious means of purifying the atmosphere; the unrespirable vapours, subsiding by their specific gravity, are carried away with the water in constant succession.

The sea, by its continual afflux and reflux, constantly importing by the former fresh supplies of the purest air, and carrying off by the latter all the unrespirable vapours which are unceasingly subsiding, constitutes its coast a most salubrious residence, when other circumstances of temperature and season correspond. But it is necessary for the

purposes of health, that the shore thus alternately washed by the sea and left dry, should be of a sandy or rocky soil. Collections of mud, or of vegetable or animal exuviae, denominated ooze, when they exist, render the neighbourhood of the sea nearly as prejudicial as clayey and marshy soils.

But there are other considerations deserving attention in making choice of a residence for the purpose of removing debility, unconnected with the actual constituents of the atmospheric mass, even when devoid of accidental contamination. The proportion of the gaseous elements of the atmosphere varies so little in different places, as to incline us to believe that the salubrity of a situation, as has been already said, does

not always depend alone on this circumstance. The quantity of air taken in at each inspiration appears to demand some consideration, because less living power is expended when the system can be supplied with the requisite quantity of air with the least exertion of respiratory action.

In valleys, where the density of the air is greatest, more must be taken in at each inspiration and less exhaustion be produced, than on high hills, where the air is considerably more rare. When this advantage is not counterbalanced by the greater impurity of the lower strata of air, we make choice of such a situation for a patient in extreme degrees of weakness, or when he is strongly predisposed to some particular diseases,

as catarrh or rheumatism, in preference to more elevated regions.

In hot climates, or in a hot season of the year, or where a valley is situated with a considerable exposure to the noonday sun, or consists of a soil which too strongly reflects its calorific rays, the side of a hill in a greater or less degree of elevation may be preferable as a residence. The greater degree of coldness of this latter situation, provided the temperature is tolerably steady and not liable to any sudden alternations, will produce a tonic effect upon the system, which under some circumstances more than compensates for the increased rarity of the atmosphere. When the patient has the means and opportunity of changing his residence frequently, it

will be no difficult matter to accommodate the situation to the varying circumstances of his case.

Whatever may be the actual situation of the patient's ordinary residence, whether combining fewer or more of the conveniences now pointed out, even should it be a residence most eligible in every point of view, still great advantage is frequently experienced by making a change, at least for a time. This is a remedial measure which has been recommended from an early period of medicine; Celsus remarking that a change even from a good air to a bad one is beneficial in the treatment of diseases. In cases of chronic debility, the utility of the practice may with great probability be ascribed to the change

of scene and change of habits of which it is productive.

Another powerful remedial measure employed for the cure of chronic debility is exercise, adapted to the present strength and ability of the patient. This is always more beneficial in proportion to the purity of the air which is respired at the time it is made use of, and consequently exercise should be taken abroad, whenever this is practicable.

The immediate effect of exercise of every description is to increase the circulation, and to render it more equable and uniform. Partial contractions, therefore, in any part of the system, are by this means more readily overcome; and the increased supply of pure air obtained by the more frequent action of the lungs

conveys to the blood in a greater degree that principle which ordinarily imparts tone to the animal fibre.

Care must be taken not to carry exercise so far as to produce much fatigue, for this would weaken, instead of increasing strength ; and it will be best always at first to be considerably within this point, and to increase the exertion by slow degrees. Those species of exercise in which the body is nearly passive, as riding in a carriage, or sailing in a boat, are well adapted to cases of extreme debility and for first trials ; next to these equitation will be useful. But the greatest benefit will be experienced from exercise, when considerable muscular exertion can be borne, and all the voluntary muscles are called into action.

Indeed, in proportion to the universality of muscular motion produced by exercise will be its utility; partial action tending to draw an excess of living power to the part, while general exercise tends to produce an equal distribution of it.

In cases of morbid disposition to universal vascular contraction, exercise suited to the condition of the patient will be found one of the most efficacious modes of cure. By this means the excess of living power before bestowed upon the vessels is derived to the muscles, and a more regular distribution of it is thus effected.

Upon this principle it is, that riding on horseback is so commonly beneficial in cases of pulmonary disease attended

with hectic fever; and when the organic derangement of the lungs has not proceeded so far as to render them incapable of performing their functions, the morbid vascular contraction is sometimes entirely removed and health restored. I have attempted, in a former part* of this treatise, to show that pulmonary disease is frequently an effect of general morbid vascular contraction; it is in such cases that we should expect to find equitation particularly serviceable.

Not only is the distribution of the living power equalized by voluntary muscular motion, but there seems to be an actual generation of it by the same means. The muscles themselves thus

* Pp. 88, 92, 93.

exercised not only acquire that portion of power of which the vessels are deprived, but a considerable increase of power; and other distant and remote organs acquire also a like increase of strength. The stomach, which before performed its functions imperfectly, will, after exercise of the voluntary muscles, become stronger and more adequate to its office: the whole system appears to be renovated, and the strength of every part increased.

Even the blood itself participates in the increase of living power thus generated by exercise; the vital attraction of its particles being rendered stronger, as is evinced by its coagulating more firmly, and becoming more dense and tenacious in its mass. A

similar effect also seems to be produced on the blood by its own motion. When the velocity of the circulation is much increased, and the sides of the vessels are acting strongly upon their contents, as in cases of active inflammation, the particles of the blood attract each other more strongly, and its coagulum becomes more firm and dense than before.

To explain the cause of this occurrence is no easy matter. There are those who talk of the secretion of sensorial power by the brain, and the conveyance of sentient and motific fluids by the nerves, and the accumulation of excitability in the muscular fibre ; but these hypotheses, examined in every point of view, will be found inadequate to the explanation. The generation of living

power is one among many of the phæno-mena of life which we must contemplate with wonder, but the foundation of which we are unable to fathom.

The efficacy of bodily exercise will be in no small degree increased when the patient can be induced to derive pleasure from the particular mode of it recommended to him. To engage the mind in any agreeable occupation conjointly with corporeal exercise, is one of the most advantageous means of strengthening the whole system; and hence most benefit is derived from exercises which demand the patient's attention in the performance of them. To be driven in an open chaise through a pleasant country is commonly useful as a restorative,

but to drive himself, when he can take pleasure in doing so, is still more serviceable to the patient.

In chronic debility, the mind as well as the body participates in the affection, and some attention is requisite in the management of the former. This is particularly the case in regulating the modes of exercise, for it will invariably be found that more benefit is derived from exercise which is prescribed as the means of obtaining some further and ulterior end, than when it is relied upon as itself the remedial measure.

The well-known story of the monarch who was cured by the medicated mallet, and attributed the beneficial effects he derived from corporeal exercise to the

exhalation from the herbs contained in its handle, is a true picture. A walk of a mile or two, to drink a glass of simple water rendered sparkling by containing a little fixed air, will often prove highly salutary from the exercise taken, when the walk itself, if recommended as the means of cure, would be encountered with apathy, if not with disgust, and totally fail of its intention.

Nothing is so prejudicial nor so much counteracts the efficacy of remedial means as anxiety of mind. When the patient's whole attention is directed to the state of his feelings, and his whole time bestowed upon watching the progress of his symptoms, little benefit can be derived from the exhibition of medicines; the living power is exhausted

faster by the anxious attention, than it can be reproduced by the efforts of the system, or by the action of tonic remedies. To withdraw the patient from himself is here a necessary step, and change of residence, change of scene, and change of employment, must come in aid of medical prescriptions.

In those cases of chronic debility where the mind partakes largely of the affection, as in hypochondriasis, hope awakened in the breast of the sufferer will be found one of the most useful auxiliaries we can call to our assistance. To persuade such a patient into a firm belief that he will find a cure in any particular plan prescribed, is to half effect the cure; while ill-founded and preying anxiety of mind counteracts and renders nugatory our

best efforts for the recovery of the invalid, confidence in the means employed singularly contributes to the efficacy of those means, and renders the plan of treatment at once easy to the physician and beneficial to the patient.

THE END.

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